Public Works Operations Improvement

Final Report

Volusia County

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SECTION 1
EXECUTIVE SUMMARY

LA Consulting, Inc. (LAC) has prepared a report on effective and efficient management practices based on the scope of our consulting services to *Improve Public Works Operations Using Management and Technology Best Practices* for Volusia County, Florida. This report outlines and provides an action plan of how maintenance and operations can be improved through implementing the basic management principles of planning, organizing, directing and controlling/improving. LAC's evaluation approach to the County Public Works maintenance operations is to investigate and document current operations and to identify opportunities to improve in all identified aspects (e.g. organizational structure, labor and equipment usage, technology needs, asset management, work effectiveness, and work efficiency).

The information is compiled from LAC field interviews, field and office observations, and research of agency documents. The information is supplemented by input from LAC staff that is experienced in both maintenance operations and management systems. Analysis of the County's performance was then conducted to determine trends and current practices and compare them to ideal industry and similar agencies' performance. The specific details are described in the body of the report as separate sections: Baseline, Findings, and Recommendations.

The report is structured as follows:

1. Executive Summary – Summary of the Baseline understanding with explicit recommendations and supporting information.
2. Baseline Section – Overall understanding of the maintenance operations for Volusia County Public Works.
3. Findings Section – One-hundred and fifty-six (156) specific findings and support information of the Public Work's maintenance and operations as compared to the ideal industry and similar agencies' practices.
4. Recommendation Section –Ninety-one (91) key recommendations that outline the benefit of improving the maintenance operations.

Existing Operations

Information is presented in general terms, rather than in technical language, for all of these areas and presented by the best management practices of planning, organizing directing and controlling.

The County is performing many innovative and good practices. Though only some of these are listed, the County has many positive efforts completed and underway. More information on these innovative practices are described in the Baseline Section.

General

- Employee agreements for training and development
- Overhead rates developed for various uses
- Live vehicle tracking
- GIS focus and support at each level

Road and Bridges

- Internal work management system in place
- Mowing support
- Extensive use of inmates
- Drainage and storm water projects

Traffic Engineering

- PM program for traffic signals
- Establishment of readily accessible emergency power supply connections for each intersection allowing for immediate response in the event of power loss
- Conversion of traffic signal lens to LEDS is about 60% complete with plans to convert 100% of the signal lens to LEDS which is saving considerable effort for both maintenance and energy cost
- Contract support for cities for markings and signs and traffic signals – performing contract work for others is a good indication of work quality which meets the needs of others and can create an additional revenue source for the County
- Traffic centerline striping
- Routine sign inspection and work planning by zone

Mosquito and Vegetation Control

- Multiple equipment for vegetation control
- Support for non-district Cities
- Spray Zones on Website with spraying notification

Water and Utility Operations

- Employee agreements where salary adjusted upon completion of training
- Joint use of water and sewer maintenance crews including Sunshine locates
- Application of SCADA – SCADA is utilized in the majority of pump sites. SCADA allows remote monitoring of sites and can make staff aware of issues that may be occurring without an on-site visit.
- Cross-training of staff

Solid Waste

- Utilization of local equipment vendor support
- Use of “woody” waste as alternative cover
- Transfer station equipment utilizes multiple attachments
- Recycle center that allows for extensive reuse of waste

Construction Engineering

- Extensive plan for Capital Improvement exists with a public involvement program
- Surveyors have extensive background and are crossed trained
- PMs manage both in-house and contract design work
- Right of Way staff prepares cost for projects and property
- PMS is being compiled
- Establishment of MS Access system tracking

Stormwater

- A Stormwater Utility exists
- Sharing of resources to meet stormwater needs
- Minimum staff to manage operations

General Facts about Volusia County

- Volusia County is ~1260 square miles and located on the north eastern coast of Florida, South of Jacksonville. In 2005, the population of the County was 493,000 with concentration in two main areas.

- The County's desirability has been increasing for more corporate relocations with major corporations in the County including Hawaiian Tropic Suncare, Boston Whaler Boats and the LPGA.

- The County has several major tourist events throughout the year that impact their operation requirements and are major traffic generators. Events include Speed Week, Spring Break, Bike Week, Biktoberfest and Destination Daytona. These events create the need for considerable services like special planning, traffic control, debris removal, and safety, which all impact working hours.

- *Staging Locations* - Currently the County has 14 sites or yards. In addition to the staging locations, the County has several additional facilities including water/wastewater facilities and Solid Waste which has two facilities.

Road & Bridge Characteristics

- Maintain a roadway network of 930 paved centerline miles and 139 dirt road miles.
- The road assets in rights of way include 157 miles of sidewalk, 367 miles of roadside ditches, 2,809 acres of shoulders, 264 miles of pipe, and 15 miles of catch basins.
- Other assets maintained are: 15 cemeteries, 183 retention basins, 48 fixed bridges and 3 bascule bridges.
- Road and Bridge (R&B) operate from four locations:
  - 44 Yard in Deland(55) – Northwest with 491 miles of road, or 46% of total
  - Osteen Yard (9) – Southwest with 33 miles of road, or 12% of total
  - New Smyrna Yard(10) – Southeast with 189 miles of road, or 19% of total
  - Holly Hill Yard (28) –Northeast with 253 miles of road, or 24% of total

Condition

- Bridge condition ratings are performed and mandated by the State of Florida following federal criteria. The scale of the ratings is zero to 100. The current average condition rating for all the fixed bridges is 84 and the rating for the four movable bridges is 54.

- The County has recently implemented the MicroPAVER System and now collects condition data based on the ASTM standards utilized by the MicroPAVER System. Ratings are now being performed by KMS consultants.

Traffic Engineering Characteristics

- Maintain and operate 414 signalized intersections, 55 flashing beacons and 54 flashing school beacons/signs.
- The County maintains traffic signals for 13 of the 16 cities on a contract basis as well as FDOT signals on state roadways.
- Traffic Operations Group is divided into: traffic signals, traffic signs/markings, engineering, planning, and administration.
- The County uses video monitoring of signals by two systems and monitors signal operations.
- The TRANSYT signal controllers and related software support are used on the entire system yet they are no longer being supported by a manufacturer.
- Most signs are fabricated on site using two computerized sign systems.
- A detail inventory of signs on roadways is lacking. A GPS tracking system of signs is currently underway.
- Centerline work is performed by in-house staff with most of thermoplastic markings and legends being done by contract basis.
- Considerable effort is expended by traffic operations in support of traffic control for special events such as Bike Week and NASCAR auto racing.
- The signal and operations staff report out of the Holly Hill yard while the traffic manager, engineering, planning, administration, signal system supervisor and technical support for signal systems and plan are located at the County Court house complex.

Mosquito and Vegetation Control Characteristics

- Vegetation management control is responsible for vegetation management within the drainage systems and right of way.
- Mosquito Control maintains Lake Monroe, 90 ditch miles and 400 miles of road rights-of-way.
- There are two staging locations for Mosquito Control: north section is Daytona Mosquito Control Yard and south section is New Smyrna Beach Mosquito Control Yard.
- Vegetation control and aerial mosquito control stage at the New Smyrna Beach Yard.
- Each day, two crews currently stage from the Daytona Yard and drive to Lake Monroe for midge control.
- Mosquito Control was originally established for a tax district. This tax district is still in place and is a major source of revenue for the Mosquito Control operation.
- Other areas are sprayed on the east side through contracts for the school board, the State, and other authorities.
- The west side is funded through a fund initiated by the County Board of Directors and/or directly with government agency in question.

- Midge control is funded by a contract with the City of Sanford in Seminole County.
- There is currently no "on call" policy in place. A supervisor will be called in when needed and will be paid overtime.

Water Resources and Utility Operations

- Assets maintained – 265 miles of waterlines, 210 miles of sewer lines, 83.5 miles of reclaimed waterlines, 121 lift stations (107 in GIS), 15 sewer treatment facilities, 11 water treatment plants, 157 manholes, 1,339 fire hydrants (153 hydrants in GIS), 1,982 water valves, 28 serviceable wells, 8 plugged wells and 11 inactive wells.
- In addition, the County is responsible for backflow devices with 1,983 sites that had backflow devices in the Tokay system in July 2006 and, in a report from 2005, had 1,647 devices.
- Staging site for operations varies with the majority of employees reporting to the 44 Yard location and Southwest Regional Plant. Additional employees stage out of the Spruce Creek Site, Southeast Regional Site and Halifax plantation sites. One employee reports to the Spruce Creek plant and then drives to the 44 Barn site using a County vehicle.

Water Operations

- According to the FY 2005 report, there are 11 water treatment plants that are maintained and monitored by the WRU division.
- Another 11 water treatment plants are overseen for Leisure Services and for the City of DeBary.
- From 1995 through FY 2006, water production increased from 732 MG to 1,276 MG. This is a 74% increase, or 6.7% annually. 6.7% is well above the actual population growth.
- Since FY 2000 when 1,224 MG were produced, water production has slowed to 4% over 6 years, or less than a 1% average increase per year.
- Appears to be experiencing negative water loss in some areas. From FY 2001 through FY 2005, water loss percentage decreased from 9.8% to 2.5%.
- Water operators are responsible for testing the drinking water quality with 3,837 drinking water samples were taken.

Wastewater Treatment Operations

- Wastewater treatment operations are responsible for 15 sewer treatment facilities, 121 lift stations, and 50 monitoring wells.
- Sewage treatment capacity for the plants range from 7,000 gallons to 1.2 million gallons. 10 of the 15 facilities are smaller "package plants" which have a capacity ranging from 7000 to 50,000 gallons.
- LAC reviewed wastewater treated in FY 2005. Millions of gallons treated between October 2005 and September 2006 ranged from 45.9 MG to 61.7 MG.
- From 2004 to 2005, reclaimed meter accounts increased from 614 in FY 2004 to 887 in FY2005 which equates to a 45% increase in one fiscal year.

Water Distribution/Sewer Collection Characteristics

- The County maintains 265 miles of waterlines and 210 miles of sewers.
- Work performed in FY 2005 included 5,393 locates, 707 new water meters, 230 water meters replaced and 270 reclaimed meter sets.
- The County utilizes one crew to perform both water distribution and sewer collections.

SCADA

The County utilizes Supervisory Control and Data Acquisition systems (SCADA) to monitor lift stations, water treatment plants and sewer treatment plants. WRU utilizes two separate SCADA systems, Wonderware and Dataflow. SCADA is currently being utilized at 113 different sites across the County. Ninety-seven (97) of the 121 lift stations currently have some SCADA utilization. There are a total of 3,630 points being monitored through the 113 sites that have SCADA throughout the County.

Utility Billing

- Based upon information provided by the County, Utility Billing had 14,609 water customers, 10,564 sewer customers, and 1,159 reclaimed water customers as of August 2006.
- As of July 2006, the meter reading has been contracted at a rate of $0.68 per meter.
- In June 2006 there were a total of 14,370 billed accounts. A report provided from the BillMaster system indicated that there were actually 15,447 meters, of which 209 meters were inactive, for a total of 15,238 meters.
- 1,159 reclaimed meters in the southwest area according to Utility Billing.
- Utility rates range from $1.60 - $6.26 per 1K gal and vary by type and volume used. The type of rates are: Unsoftened for Water and Irrigation, Reclaimed Water, Softened rates for Water and Irrigation and Sewer Rates.

Solid Waste Characteristics

The Solid Waste Division is responsible for operations at the Tomoka Landfill, the West Volusia transfer station, unincorporated residents trash collection, and recycling for ~43,000 customers through Solid Waste Management Contract. Solid Waste employees stage out of two separate locations: the Tomoka Landfill or the Transfer Station.

- 73% of the refuse tonnage was delivered to the Tomoka Landfill.
- In 2005, the Tomoka Landfill had 400,490 tons of refuse and the transfer station had 155,243 tons of refuse which is 27% of the total refuse.
- In 2005, Solid Waste processed 187,751 vehicles. 33% of these vehicles were processed at the Transfer station.
- The unincorporated portion of the County makes up only 19% of Solid Waste customers.
- The volume used in 2005 was reported at 401,869 for Class I and 131,136 for Class III. Class I is projected in 2006 at 507,735 and 228,321 for Class III. Also, the amount of fill used for cover in 2006 is estimated by County at 402,121 CY.

Transfer Station
The transfer station is located on the West Side of Volusia County. Commercial and Residential vehicles can bring refuse, recycling, and woody waste to the site for disposal. Waste is then transferred from the Transfer Station to the Tomoka Landfill. In general, haul truck travel via Highway 4 to the Landfill is approximately a 17 mile route and takes 25 minutes in one direction.

In 2005, 9,907 loads were hauled and in 2006 10,438 loads were hauled. 2005 shows a 21% increase in the number of loads hauled in 2004. From 2002 to 2004 the number of load hauled remained relatively constant with a 2% increase overall. 175,000 CY were hauled in 2005.

Tipping Fees
The County currently charges a fee for residential waste collection for garbage, recycling and yard waste, and tipping fees at the Transfer Station and Landfill for waste disposal. The fees are as follows:

- Waste Collection Fee - $132.00
- Tipping Fees
    - Flat Rates
        - Cars - $4.00
        - Pickup, Vans and Trailers - $8.00
    - Waste Rates for Vehicle Over 2.5 CY Capacity
        - Class I Garbage - $34.00 per ton
        - Class III Garbage - $28.00 per ton
        - Yard Trash and Land clearing - $ 23.00 per ton
        - Clean Debris - $13.00 per ton
        - Tires - $100.00 per ton (vehicles) and $160.00 per ton (oversized)
        - Asbestos - $200.00 per ton

Construction Engineering Characteristics
- County construction engineering group which is located at the County Court House annex is responsible for project management and design, survey, rights of way acquisition and planning, construction management, roadway condition assessment and administration.
- The main function of this group is to implement the five year capital improvement program.
- This effort results in expenditures of $35-45 million annually with 40-60 projects normally being active on a specific task component (survey, design, construction, etc.) on an annual basis.
- Construction management manages the pavement management program to determine condition using APWA MicroPAVER system.

Stormwater Characteristics
- Stormwater assets are drainage ditches, retention ponds and outfalls.

- Stormwater is managed by Stormwater Engineer and inspector engineer who are organizationally under the Water and Resources Utility Division.
- Much of stormwater work is actually performed by the Road and Bridge Division and the Mosquito Control division with support though outside contracts.
- Nearly 4 million of the $4.75 million dollar adopted budget was reimbursable in FY05/06.
- Road and bridge performed $2.2 million of the operations reimbursable for stormwater work in FY2005/2006.
- In some instances, it is difficult for the divisions to determine what work is considered stormwater and billable versus what is directly from their division budget.
- In addition, the County policy being implemented outlines the division of responsibilities for stormwater utilities as 100% of retention ponds, 50% of cross drains, and 100% of outfalls.

Activities Performed

Volusia County performs a myriad of activities for all County infrastructure within Road and Bridges, Traffic Engineering, Mosquito Control, Water and Utility Operations, and Solid Waste.

Road and Bridges

- 27 of 81 activities performed accounted for 80% of the total hours worked.
- Top ten activities based on total labor hours are bascule bridge operation, sidewalk work, install new drainage, pre-mowing/trim/litter removal, emergency-protective measures, retention mowing, routine tree trimming, supervisor planning/requests, litter removal, and tree work- remove.

Traffic Engineering

- 2 of the 21 recorded activities account for 80% of the work effort – installation and equipment replacement.

Mosquito Control

- 4 of the 13 recorded activities account for 80% of the entire effort in hours.
- Top activities are floodwater inspection, landing rates, trapping, and administration.

Vegetation Management

- 7 of the 26 recorded activities account for 80% of the total effort.
- Top activities are pepper maintenance, aquatics, personal leave/sick, training/class, retention area, hand clean ditch, and roadside ditch.
- Ditch Cleaning crews recorded 7 of 75 job codes accounted for 80% total effort

Water Resources and Utility Operations

- 6 of 52 recorded activities account for 80% of the total effort.
- Top activities are locate water and sewer, install 5/8 meter, lift station problem, final inspection, install reclaimed water, and install/replace backflow.

Solid Waste

- Through interviews, County provided information, and general observations, a list of major activities was compiled.
- Ground Cover appears to be the key function in Solid Waste.
- The top of each cell must be covered each day, and this appears to be the major use of regular and overtime hours.

County Budget

The Public Works Department utilizes a line item budget based on historical expenditures and anticipated needs of the Department. Each department submits their own budget which is combined to create the Pubic Works Department Budget. Key Funding Sources by Public Works Division have been summarized below.

- Solid Waste
  - Tipping Fees and Annual Collection Fees
  - Recycling Sales
  - License and Permit Fees
  - Intergovernmental Revenues
- Road & Bridge
  - Contract work for Cities
  - Intergovernmental Revenues
  - Gas Tax
- Traffic Engineering
  - Contract Work for Cities
  - Gas Tax
  - Transportation Impact Fees
- Water and Utility Operations
  - Utility Billing Fees
  - Intergovernmental Revenues
- Construction Engineering
  - Gas Tax
  - Transportation Impact Fees
- Mosquito/Veg. Control
  - Contract Work for Cities
  - Intergovernmental Revenues

In addition to compiling a line item budget, each division provides a list of performance measures that it expects to accomplish. The performance measures are included in the final County budget but do not link cost of the performance measures to the actual budget.

LAC used the Engineering News and Record (ENR) construction index to adjust all of the Division budgets from FY 2001-02 to FY2004 -05 in 2005 dollars. Overall,

- Water budget increased 58.8% between 2001 and 2005 or 14.7% annually.
- Construction Engineering budget increased 99%,

- Mosquito Control and Vegetation 17%,
- Administration 18%,
- Road and Bridges 8%,
- Solid Waste 36%,
- Traffic Engineering 2% and
- Water Resources and Utilities 18%.

Overhead
The Public Works Administrative section fiscal personnel, who are responsible for creating and monitoring the budget, also calculate the County's annual overhead rate. The separate rates calculated are for internal charges within Public Works, internal charges within the County and charges external to the County. The average internal public works overhead is 142%, the average internal County overhead is 150% and the average external overhead rate is 180%. A fourth rate is charged for all divisions for FEMA. The FEMA overhead rate is 47.3% for regular time and 17.7% for overtime.

In addition to applying an overhead rate to hourly charges, the County applies an overhead rate to materials for a handling fee. The average material overhead is 13.32% for all divisions. Utilities has the highest material charge applied of 33%, followed by Traffic Engineering (14%), Road and Bridge (11%), Solid Waste (10%), Mosquito Control (7%) and Mosquito Control-Ditch (4%).

Stormwater Budget
Although stormwater is not a separate division it has its own separate budget fund and unique funding source. The current adopted budget expenditure for stormwater is $4.75 million with estimated actual expenditures being closer to $5 million. There was a dramatic increase in the actual 2005 to the current adopted budget. This appears to be due to an increase in the maintenance activities and local project line items. Between FY 2004 and FY 2005 actual, the budget increased 3.5%. Between the 2005 actual and the adopted budget there was a 110% increase in expenditures.

Resources and Organization

The Public Works Department is a multiple layered *organization*. There are three levels of management above the Public Works Director which includes the County Council, the County Manager, and the Deputy County Manager. The span of control between the Public Works Director and Division mangers and administrative aide is 1:8. All resource information is from the point in time original organization charts were received. Changes made to the organization during the review will not be reflected in this information.

The Department of Public Works is managed by the Director of Public Works and is divided into seven divisions which are functionally classified. The general responsibilities for the seven divisions are as follows:

- Public Works Administration – The administrative unit includes the Public Works Director, Operations Manager, Fiscal Resource Manager, Special Project Manager

and GIS specialist. General responsibilities include providing management and support to other divisions. In addition, this division compiles and monitors the Public Works budget and calculates overhead, oversees contracts and special projects, and assists with GIS and database needs.

- Road and Bridge – Road and Bridge is responsible for maintaining the County's roadways, mowing, cemeteries, and bridges. Work includes support for stormwater assets.
- Mosquito Control and Vegetation– Mosquito Control is responsible for the abatement of mosquitoes through inspection, chemical control (truck & helicopter), monitoring traps and chickens. The vegetation crew is responsible for chemical control and abatement of vegetation. Mosquito Control and Vegetation also performs work for stormwater.
- Construction Engineering – Construction Engineering's main responsibility is to develop the 5-year capital improvement plan utilizing planning, survey, design, right of way and construction management employees.
- Water Resource and Utilities – Water Resources and Utilities is responsible for maintaining water and sewer treatment plants, water quality, utility billing, water distribution lines, sewer collections lines and adjoining assets such as manholes and meters. The engineer responsible for stormwater is under the Water Resources and Utilities division.
- Traffic Engineering – Traffic engineering is responsible for maintaining signs, signals, and markings. In addition, Traffic Engineering has two planners part-time and traffic engineers who perform or monitor traffic studies and control signal timing.
- Solid Waste – Solid waste is responsible for the Tomoka Landfill, the transfer station, consumer waste collection recycling, and educational programs.

The Public Works Administration division reports directly to the Public Works Director and has one additional layer of management. The span of control between the Operations Manager and his direct reports is 1:3.

The Road and Bridge Director reports directly to the Public Works Director and has four additional layers of management.

The span of control for the Road and Bridge Layers is as follows:

- Director to Manager/Supervisor – 1:2
- Manager/Supervisor to Supervisor IV or office admin staff – 1:3 to 1:12
- Supervisor IV to Supervisor III – 1:1, 1:5 to 1:6
- Supervisor to Direct Reports – 1:3 to 1:21

The *Traffic Engineer* reports directly to the Public Works Director and has three additional layers of management.

The span of control for the Traffic Engineering Layers is as follows:

- Traffic Engineer to Direct Reports – 1:6
- Engineer/Supervisor to Direct Reports – 1:1 to 1:6
- Traffic Signal Supervisor/Supervisor III to Direct Reports – 1:4 to 1:7

The *Water Resources and Utilities* **(**WRU) director reports directly to the Public Works Director. The WRU division is divided into two sections including utility engineering/water resources and operations. Overall, the WRU Division has 3 additional layers of management.

The span of control for the 3 layers of the WRU division is as follows:
- Director to Manager or Engineer – 1:7
- Manager/Engineer to Direct Reports – 1:1 to 1:6
- Engineering Asst/Specialist/Supervisors to Direct Reports – 1:1 to 1:10

The *Solid Waste* Director reports directly to the Public Works Director. The Solid Waste division has three additional layers of management.

The span of control for the 3 layers of the Solid Waste division is as follows:
- Director to Manager/Direct Report – 1:6
- Manager/Supervisor to Supervisor III/Direct Reports – 1:1 to 1:7
- Supervisors to Direct Reports – 1:2 to 1:14

The *Mosquito Control* Director reports directly to the Public Works Director. The Mosquito Control division has two additional layers of management. This outlines the control and layers of management at the initial time of this report. Mosquito Control reorganized their department during the middle of this review and changes have been to the organization since the gathering of initial information.

The span of control for the 2 layers of the Mosquito Control division is as follows:
- Director to Direct Reports – 1:15
- Supervisor to Direct Report – 1:3 to 1:12

The County *Construction Engineer* reports directly to the Public Works Director. The Construction Engineering division has three additional layers of management.
The span of control for the 3 layers of the Construction Engineering division is as follows:
- County Engineer to Engineering Supervisor/Engineer –1:8
- Supervisor/Engineer to Direct Reports – 1:1 to 1:9
- Survey Coordinator/Engineering Supervisor to Direct Reports – 1:2 to 1:9
- Survey Tech II to direct reports – 1:3

Construction Management's main function is to complete the five year capital improvement plan. This is done by a series of groups that are divided up functionally within Construction Engineering: Right of Way, Survey, Project Management, Construction Management and Administration.

Each of the groups within Construction Engineering serves specific functions that assist in the goal of developing the capital improvement plan. The group functions are as follows:

- Administration Functions – Provide administrative support; assist in CIP documentation, GIS support and financial reporting.
- Design and Project Management Functions – Manage and design projects in-house and by contract, coordinate permits, outline right of way needs, manage consultants, check plans, in-house design and management of in-house teams.
- Survey – Right of way mapping, manages right of way design, review of plans, prepare legal descriptions and perform surveys.
- Construction Management – Manages construction projects and road rehabilitation.
- Right of way – Provides cost estimates, manages right of way acquisition process, negotiates land, appraises land, provides public information and researches land ownership and property values.

Years with the County
On average, employees have eleven years with the County. There are several classifications that have over 25 years of experience including the supervisor III, support services manager, traffic signal supervisor, senior S/W compliance officer, the mosquito control director, engineering specialist, aircraft mechanic and airborne inspection supervisor classifications.

Overtime
In 2003-2004 the County tracked 676,117 hours of regular time and 43,049 hours of overtime. In 2004-2005 the County tracked 738,116 hours of regular time and 84,066 hours of overtime and in 2005-2006 the County tracked 687,643 hours of regular time and 63,699 hours of overtime. As indicated by the numbers recorded in 2003-2004, overtime was slightly more than 6% of regular time. In 2004-2005, overtime hours increased dramatically to over 11% of regular time. This was due to hurricanes that occurred during this time frame, which resulted in increased overtime. In 2005-2006, the overtime reduced from the previous year to just over 9% of regular hours.

In 2005-2006, Solid Waste had 14% of overtime; road and bridges had 13%, followed by Traffic Engineering at 6%, then Water Resources and utilities at 5%, then Mosquito Control at 4% and Construction Engineering at 1%.

Employee Certifications
In addition to training received by the County, many employees have and/or acquire specialized certifications. Both Water and Wastewater Operations within Water Resources and Utilities have certified operators. There are 3 water treatment operators, 5 wastewater operators and 13 dual licensed operators for each function. Solid Waste has many specialized functions that require training which are tracked and recorded in an MS Excel spreadsheet. After review of the MS Excel file, 39 specialized trainings were identified with some employees being trained on multiple functions. Training for Solid

Waste includes: Spotter, Land Fill Operator, MRF, Transfer Station, and C&D. Construction inspectors also have various MOT for stormwater, A/C, ACI, and FDOT Construction. Traffic Signs has 6 IMSA certifications between grades 1 and 3. Traffic Signals also has six IMSA certifications with a minimum of grade 2 level. Other certifications and specialized training may exist and vary by division.

County Labor Resources

The Public Work Department has a total of 429 full time positions that are staged out of various barns throughout the County. In addition to the 429 positions, the County utilizes temporary staff and inmates.

- Road and Bridges have the most employees of all divisions equaling 36% or 154 employees,
- Solid Waste employees make up the next highest total number of employees at 17% of the Public Works Department, or 74 employees,
- Water and Utility Operations has 58 employees (14%),
- Mosquito Control and Vegetation have 50 employees (12%), Construction Engineering has 49 employees (11%) and,
- Administration has 6 employees and is only 1% of all Public Works employees.

In addition to the employees outlined above, the Public Works Department utilizes inmates as a cost effective form of additional labor. At the time of this study inmates cost the County $12.03 per hour when accounting for County labor and equipment support.

DROP Program

The DROP program is a State Mandate Retirement Program that allows employees to terminate employment and retire, yet work for the County on an extended time for up to five years. Currently there are 27 employees who will be leaving the Department within the next 5 years, many of which are senior staff within the department and have considerable institutional knowledge of the County's operations.

County Equipment Resources

There are 499 pieces of rolling stock and equipment assigned to the County's Public Works Department, including two (2) helicopters that are utilized for Mosquito Control. Information was determined utilizing the County Fleets Faster system as it was determined to contain the most comprehensive information for all of the Public Works Departments combined. Information is from a point in time from when it was received.

- Administration has 1 pieces of equipment
- Road and Bridge has the most equipment (247 pieces)
- Solid Waste (81),
- Mosquito Control/Vegetation (79 pieces),
- Water and Utility Operations (48 pieces),
- Traffic Engineering (26 pieces), and Construction Engineering (17).

The average age of all of the County's Non-rolling stock is 6 years. There are 219 non-rolling stock items in Public Works.

Road and Bridges has the greatest number of non-rolling stock items (80), followed by Solid Waste (71), Water and Utility Operations (37), Mosquito Control/Vegetation (19), Traffic Engineering (11) and Construction Engineering(1).

Much of the Public Works Department's equipment is leased through the Fleet Division. Approximately 29% of all Public Works Department equipment is leased. In general, light equipment is leased and heavy equipment is owned by a specific division.

In addition to the rolling stock described above, Mosquito Control has two helicopters: a 056 and 10B. The helicopters are owned and maintained by Mosquito Control and a flight log is kept indicating the number of hours each helicopter flies and the type of activity the helicopter was performing. Based on flight logs obtained from the County, an individual aircraft did not exceed 15 hours of flight time on average per month during May 2005 through April 2006.

Equipment Rates
None of the rates used are calculated using actual maintenance cost and depreciation costs. In most cases, rates that are utilized are based upon industry standards. Mosquito Control and Traffic Engineering use industry rates in their system for costing. Road and Bridge has rates in TIS but they have not been updated in 3 to 5 years and Water and Utility operations tracks labor to a work order but not equipment.

Fleet Division and Maintenance
The Fleet Division is responsible for maintenance of vehicles for the Public Works Department. The Fleet division has established specific equipment PMs by type and interval for equipment. The equipment PMs are as follows

- Heavy/Diesel Equipment
  - A – 200 Hours
  - B – 1,000 Hours
- Light Equipment
  - A – 5,000 Miles
  - B – 15,000 Miles
  - C – 30,000 Miles
- Generator Pumps
  - Inspected twice per year
  - PM every 150 Hours

While each division manages its own equipment and replacement budget, the Fleet division charges each division for work performed. The current average rate per hour charged is $49 with an expected increase to $55 in the upcoming year with a 14% markup on parts.

Contract Work
The County also uses contract support to perform many activities. Major maintenance service contracts used by the County include rehabilitation of dirt roads, flat and slope mowing, resurfacing, meter reading, and trash collection and recycling. The decision for use of these

contractors is made on a case-by-case basis by management and is normally the result of the County's requirement for specific skills and/or proceeding by the lack of resources.

Work is also performed by Public Works for other agencies and is billed externally. The divisions utilize the external overhead rate and material markup specific to each division and bill on a time and material basis. The hourly rates are established by the fiscal division, the material rates are based on actual with the fiscal markup and the equipment rates vary by division and in some cases, such as Water Resources and Utilities, is not billed or tracked.

- Road and Bridges performed $1.75 million dollars of reimbursable work for contract cities,
- Mosquito control $279,000, yet Information in the Mosquito Control budget indicates the actual revenue from all contracts is closer to $693,000 (48% of operational budget), and
- Traffic engineering $152,000.

Traffic Operations has contracts with all cities within the County except for Daytona Beach and DeLand to perform traffic sign maintenance and operations support. In the case of the City of DeBary, the County has a contract not to exceed $74,000 for the year. The County bills the City of DeBary on a time and material basis monthly.

Road and Bridges performs extensive work with the City of DeBary and Deltona, Mosquito Control performs work for the Cities in the west and unincorporated County and Water Resources and Utilities provides collection and distribution work for the City of DeBary and Deltona as well.

Work Scheduling, Routines and Identification

Work Identification

Work is identified by several methods within each division. In general there are five main areas that assist in work identification. These include response work, inspection, preventative maintenance, routines, and by staff in the field.

Work Scheduling

Work scheduling varies for each division and has been outlined below.

- Road and Bridges – Road and bridges have some routines but work is scheduled with maintenance staff daily. Each morning supervisors meet with their crews and provide assignments. In the case of large projects or tree trimming, scheduling will be performed at the supervisor's weekly meetings to allow for better coordination.
- Mosquito Control – At Mosquito Control, work is assigned by function or supervisor. The herbicide application and heavy equipment ditch cleaning tasks go to the appropriate supervisor and the remaining work is assigned by supervisors with specific inspectors being responsible for their zones. Inspectors then perform work as needed in their zones.

- Solid Waste – Scheduling varies by supervisor in Solid Waste. In general, supervisors meet with staff at 7:15am for daily assignments. A weekly schedule is also developed to ensure coverage of the landfill and transfer station.
- Traffic Engineering – Traffic Engineering varies by maintenance function. The Traffic Signs group develops a weekly schedule with a zone rack assignment. This allows crews to go to their zone/rack assignment and pick up the signs they need and begin to perform work. Sign workers will check each morning prior to leaving the yard to ensure schedule has not changed due to response work. Traffic signals assign work daily with some work such as signal PM on a routine. Signal workers will check in at Barn 44 to make sure there is not an emergency then they will drive to Holly Hill Barn to receive assignments. Traffic marking meets daily to review work, and work is performed on a routine basis.

Work Requests, Tracking, and Systems

The County utilizes a different work tracking approach for each division within Public Works. Some divisions share similar software, but often utilize them differently. Both Road and Bridge and Solid Waste use the TIS system, but Road and Bridge tracks service requests, work orders, time, materials and accomplishment where Solid Waste tracks overall time, complaints and citations. Further, Mosquito Control and Traffic Engineering use Primavera software. While Mosquito Control uses Primavera as a project scheduling tool, Traffic Engineering uses Primavera as a work tracking tool. Each division does track time to a daily payroll sheet. Some of the division systems used are listed here:

- Road and Bridge – TIS, MS Access
- Solid Waste – TIS, E-Scale, MS Excel
- Mosquito Control – Primavera, MS Excel spreadsheets, GIS, P3 and HERB MS Access database
- Vegetation – Legacy 6000
- Water and Utility Operations – BillMaster, MS Excel, Tokay and the AllMax
- Traffic Engineering – Primavera, P3, MS Excel
- Construction Engineering – MS Access

The County maintains several independent databases for maintenance and operations. The databases are maintained in a variety of different systems and applications. Further, there are additional inventories and files, which are tracked manually or in MS Word documents and MS Excel spreadsheets. A list of the major general databases and work spreadsheets includes:

- LifeTrak –Vehicle GPS tracking system
- Kronos – Timekeeping system
- GroupWise – E-mail system
- GIS – GIS product from ESRI vendor is utilized at varying degrees by the divisions based upon experience and desired need.

All divisions compile a monthly report for the director of Public Works. These summaries are provided in a MS Word document and the content varies by division. There is no set standard format for providing the summary and is left to the department's discretion. Information is compiled manually and comes from a variety of sources.

Management Functions

Typically, a well-structured management process involves completion of the planning, organization, directing and controlling functions regarding maintenance.
The planning effort involves determining major activities, defining guidelines, obtaining resource information, performing a condition assessment, and computing the level of effort that, in turn, allows a work program and budget to be determined. The next phase, organization, further divides the work program into work to be performed on a monthly basis. This phase allows the work by activity and resource requirements (labor, equipment, and materials) to be determined each month. The direction phase uses the calendar, work request, routine maintenance programs and work backlog to generate a short-term schedule. This schedule is then used to direct staff to perform work by location. The completed work is recorded and tracked by the automated system. A series of outputs are then generated which give supervisors the planned versus actual effort of maintenance. This information is used to evaluate the field effort and identify opportunities to improve field performance. Actual accomplishment information derived from processes is used in each year's update process. Each division is performing some of these efforts, with work processes outlined in the Baseline Section for each division.

Recommendations

This is a brief synopsis of the recommendations and they are broken into four categories – General (14), Planning (31), Organizing (35), Directing/Controlling (11). The details of the recommendations and supporting information are in the body of this report.

General

1. Annually select and utilize capable employee teams to implement improvement processes.

The County employees have many positive and innovative ideas. Employee involvement can be a key component in the future implementation of recommendations.

2. County should establish and plan operations for a combination of both rural and urban communities and align resources, processes, and work methods to match those demographics.

The County is in transition from a rural community to a more suburban one. The County should plan work and standards to meet the demands and service levels of a suburban community.

3. **Assign staff to yards or facilities based on work needs, not historical experience. Further employees should report directly to the facility where they work such as signals and the south east drainage crews. Midge crew should be stationed closer to Lake Monroe and ditch crews should be stationed closer to their work.**

Staffing has been allocated to yards based on historical experience of the County, supervisor judgment and an attempt to balance resources. When looking at where the staff is staged out of compared to where work is performed, it does not match.

4. **Stage equipment and materials close to the job site rather than yards, such as grading and MC ditch work, thus saving travel time.**

Traveling with heavy equipment can increase typical travel time and impact performance. To minimize the delays, staging areas should be close to the job site.

5. **Mosquito Control should allocate and assign resources to the west side and utilize existing road barns for work staging.**

The Mosquito Control Division currently has two yards located on the eastern side of the County, and 20-30% of work is performed on the western side of the County. Resources should be allocated to the western side to eliminate and reduce travel time and increase the number of productive hours.

6. **Consolidate two mosquito control yards into New Smyrna Beach yard.**

The two Mosquito Control yards on the east side should be combined using the lower cost facility in New Smyrna Beach. This will reduce the cost to lease land, allow easier communication, and eliminate some redundant equipment while having a minimal impact on travel time.

7. **Define Department wide "on call" policy and cross train staff to minimize the need for staff on call. Link response requirements and use of take home vehicles.**

Currently each division handles their own internal "on call" policy differently. The County should define an "on-call" policy and then cross train employees between divisions to reduce the number "on call."

8. **Minimize the number of systems and implement a Countywide Computerized Maintenance Management System (CMMS) for work planning and managing. Eliminate "in-house" systems and utilize only off the shelf systems (OTS). Further, CMMS should have the ability to plan and manage all work including ability to plan and monitor special events.**

LAC has documented 63 systems throughout the County with additional systems assumed to exist. To improve automation and compile information in a consistent format, the County should minimize, optimize, and standardize the number of systems throughout Public Works with a maximum of 4-5 systems to be sufficient.

9. Replace AllMax system with new CMMS and ensure that new system allows for easy retrieval and access of data. Link or replace the Tokay system.

The new CMMS will have work order capabilities; therefore, it would be desirable to replace the AllMax system with the new CMMS.

The County should attempt to find a CMMS that can replace the Tokay system, and if they can not through an RFP process, the County should consider linking the Tokay system to the CMMS as an effective alternative.

10. Integrate manual log with GPS system and new CMMS.

All County employee assigned vehicles must complete a manual truck log sheet. Many vehicles have been outfitted with GPS tracking systems with future implementation of GPS in all Public Works vehicles. The manual truck log should be integrated with the new CMMS, once the County has implemented it. This will eliminate the duplicate efforts between the manual log and GPS tracking.

11. Improve telemetry to allow for both monitoring and control at all sites. Establish system that eliminates "ghost" calls for "on call" utilized staff.

SCADA technology can prevent emergencies through better monitoring and tracking. This can reduce the need for staffing during the evening and weekend hours. Having control functions will allow operation of assets and can be used to isolate issues remotely rather than having to travel to a site.

Further, the County's existing system makes "ghost" calls which are alarms that County staff must check on without any apparent issue or problem that exists. Obtaining an additional or more advanced telemetry system can eliminate these calls.

12. Accurate and specific cost for providing utilities support for adjacent unincorporated areas next to cities utilities as well as outlying remote areas should be identified.

The County currently bills different rates based upon east side or west side, yet there is no billing cost difference for customers that live in outlying areas versus urban areas near the regional plants. It costs more to travel to these outlying areas.

The County should utilize the new CMMS to determine the cost of providing services to urban areas versus outlying areas and if those costs are being recovered.

13. Eliminate small isolated package facilities and establish policy and requirements for new subdivisions. This will ensure any new system operations are financially feasible with quality criteria established to minimize creation of isolated high maintenance facilities.

Outlying systems, like package plants, that are independent of existing water facilities are expensive to operate and maintain and require considerable travel time. The County should eliminate the isolated package facilities wherever possible and establish an outline to specify criteria to ensure that new developments will not be at the expense of the County.

14. Become more cost effective by expanding users through options to share utility services with Cities and/or transfer of services. If not viable, reconsider future of providing service. Acknowledge that a small amount of customers and large distribution size precludes long term cost and service comparison to small geographical cities especially in the County.

The County provides both water and sewer services for a relatively small number of users (27,403 customers) which makes it most difficult to perform work cost effectively.

The County should try to share or provide contract support services with cities. If not viable, the County should review options to transfer services to cities.

Planning

15. Establish an accurate count of meters and bill for the number of meters owned by County.

Multiple meter summaries regarding the actual number of meters have been presented by County staff. The situation is compounded by the fact that meter inventories and installs are in both the billing systems and maintained by the Utilities operations yet there is no direct linkage.

Having the correct number of meters stored in one location will ensure that the County is appropriately billing revenue.

16. Water and sewer lines need to be inventoried with components and attributes, including spatial data then stored in GIS.

The County water and sewer line inventories are lower than LAC's benchmark data. The County has begun to transfer CAD files to GIS to update and affirm inventory.

This should be completed and all water and sewer lines accounted for and entered into GIS. This accurate inventory can be used to develop a work program and budget, estimate resources needed, and establish maintenance routines.

17. Confirm cause of negative water loss being reported for some water operations.

The County should determine the cause of negative water loss which indicates either a reporting problem or some major infiltration. Water loss is an indicator of efficiency; the lower the water loss the better the efficiency and effectiveness of the operation. The negative loss is masking the County's overall reporting done to the State.

18. County should standardize and replace existing traffic signal controllers with those meeting current industry standards through a transition process.

The County has a good operational practice utilizing only one controller type, yet the type of controller is both outdated and no longer supported by any manufacturer. The County should replace existing outdated NEMA traffic controllers with those that meet current industry standards. This should be a transition process to minimize costly impact.

19. Traffic Engineering should establish formal contracts and work process with all agencies including specific scope and reimbursement schedule. This contractual revenue should be included in the traffic budget and establish a credit process to budget for these receipts.

Traffic Engineering is currently performing work and bills for many cities based on verbal agreements. It creates a lack of ability to project revenues, allocate resources, and account for revenues.

The County should establish contracts to maintain good working practices with clients and be able to include the contract needs in the annual work plan.

20. Establish and collect inventory of regulatory signs and link spatially.

Traffic control regulatory signs lack inventory identification. The existence and installation of these assets should be documented so County staff can plan routine maintenance, routine replacement, develop work plans, and resource needs. The sign inventory should be stored or linked to a spatial database to be viewed graphically.

21. Routine maintenance should be established for all groups and documented in similar manner to signs including hydrant flushing, valve turning, and sewer line cleaning and inspection.

Routine cyclical maintenance is currently being performed on several activities among Public Works. The Utilities Division performs several activities that would be optimal for the establishment of PM routines including hydrant flushing, valve turning, and sewer line cleaning and inspection. Other activities in other groups can benefit from routines too. The County should establish routines for all groups on the appropriate activities and cycles and store in the CMMS.

22. Consider purchasing all signs prefabricated and eliminate most of sign manufacture operation.

The County should perform an evaluation of direct purchase of sign sheeting and sign blanks as the cost appears to be less than the cost of the components for all signs that are purchased. Other agencies in the state have found that the cost to purchase signs prefabricated is less than the cost to purchase the various components and fabricate the signs.

23. Perform traffic marking work that is most cost effective manner with both internal and contract support. Perform thermo plastic marking in the intersections with "in-house" staff and outsource the routine long line paint work.

The County is currently performing long line paint work in-house and contracting the thermo plastic work in intersections. The most effective use of contractors would be to do the long line striping for short term large work volumes. This should reduce the outsource cost as the work can be packaged and does not require the skill as the thermo plastic marking. By having in-house crews perform the thermo plastic marking it will allow the crew to control the quality of the work.

24. Separate access and functions of small vehicles from large commercial vehicles at the landfill to allow mainly professional haulers on hill. Establish a separate citizen's area.

Currently the County has one access area at the Landfill for commercial and small residential vehicles. The Benchmark agencies utilize a separation of commercial and residential vehicles which results in a safer and more effective practice.

Provide separate access points to the landfill and transfer stations for large commercial vehicles and smaller citizen's vehicles.

25. Evaluate use of "haul and drop" capability. Haul garbage trailer to be unloaded at landfill allowing each tractor truck to make more trips and reduce overall cost.

The County averages only 3-4 trips per driver while benchmark agencies have experienced 5-6 trips per driver in urban areas with a longer drive distance.

The County should use a combination of "yard mules" and haul trucks. The trucks would be loaded at the transfer station, drop their full trailer at the landfill in a desired area and pickup an empty trailer prior to returning to transfer station. A "yard mule" truck would then pick up the trailer and deliver it to the top.

26. The County should evaluate the economic benefit versus the cost of the continuation of the transfer station operations. Several options should be considered with two requiring evaluation. First the County can close the transfer station; or alternatively the cost for the transfer station should be allocated directly to the customer; or consider having commercial customers haul directly to the landfill and only allow residential use.

The Landfill is approximately a 25 minute drive from the transfer station during non-commute hours. An initial *break even* analysis of determining the trade off between having a transfer station and requiring commercial vehicles to haul directly to the landfill indicates the optimal location of a transfer station would be over twice the current distance.

First Scenario – If it is determined a transfer station is needed to meet the residential community needs for convenient waste disposal. The operational costs could decrease if commercial users were restricted to dumping at the landfill. That additional cost per ton should be charged directly at the transfer station raising the transfer station for resident usage.

Second Scenario - If the County determines a transfer station is needed and allows commercial use, then the additional cost should be charged directly to the commercial users.

Third Scenario - The complete cost per ton is defined as the amount of total dollars to place 1 ton of waste into the ground. The cost at the transfer station exceeds the revenue received from Waste delivered there. The cost could be then directly allocated to the users of the transfer station and rates adjusted accordingly.

The County should evaluate these and other options to ensure that the transfer station operation is warranted and the cost of collection is properly allocated and revenue collected to correspond to the cost.

27. Consider closing the transfer station on Saturdays and close the Landfill on Sundays.

The County should also evaluate the days in which the transfer station is open to the public. Saturdays appear to have limited use and may not be cost effective to have the transfer station open. Only 4% of the tonnage that was received at the landfill was on Saturday. The County could reduce the cost of the transfer station if it is not open on Saturdays.

Sunday has the least amount of use at the landfill, and the main users are small residential customers. Residential customer needs may be met by having the landfill open on Saturdays. Most other benchmark agencies do not open on Sunday and those that do operate at a loss.

Further a traffic generation development "mega church" site is being built near the landfill entrance. There will be a potential conflict in traffic on Sundays. Closing the landfill on Sundays will minimize any conflict in traffic.

28. Restrict commercial activity at Landfill to two hours in advance of closing.

The Landfill often has to extend the time of operations as a result of late in the day arrival of haulers, and results in the closure and covering of landfill to later times and staff working overtime. By restricting contractor haulers to earlier times than small residential users the County could reduce some of the need for overtime. This concept has been used by benchmark agencies to minimize overtime.

29. Establish the capability of developing a performance budget and plan in the CMMS. Base the plan on the level of service, inventory, productivity, and link to a quality standard by activity. Use established performance budget as a tool to develop a budget for each department based on actual maintenance needs.

The current County budget process of determining resource needs should be enhanced. This work program should be established by activity and include inventory, level of service, productivity, and required resources. Also, each outcome (road miles graded) should be linked to a quality standard. This method establishes a budget based upon actual maintenance requirements.

The performance budget would not only establish accountability for maintenance, but it is a good business practice. This should be a standard capability of the CMMS.

30. The consideration for establishing a main Public Works yard at the landfill site should be based upon resource deployment and workload optimization utilizing service levels and travel time minimization. The County should compare estimates of workload utilizing the CMMS with specific yard locations and allocate staff appropriately.

There is currently a plan to shift Public Works resources to a new site at the landfill. A tradeoff of saving on land and office operational costs versus the costs of productivity loss and increased response time should be weighed.

The County should compare workload from the performance plan developed in the CMMS with the location that the employees stage and determine where best to assign labor and equipment resources to minimize travel time.

31. Bridge Inspection Reports should be used by Road and Bridge for work identification and scheduling.

The state transportation department (FDOT) inspects any vehicle bridges over 20 feet. Each inspection report identifies rehabilitation and maintenance that should be performed. This information is useful for determining and prioritizing work that needs to

be performed on bridges. Currently, information from the inspection report is only stored in engineering and is not being used by Road and Bridge to schedule and perform maintenance.

32. Preventative maintenance program should be designed, planned, and used to schedule work for bridges and staff assigned.

The only current preventative effort is the weekly inspection of the three movable bridges. Performing planned and routine preventative maintenance on bridges can reduce the reactive work that needs to be performed on the bridges and increase the life of an asset. Programs need to be established in the CMMS for basic preventative tasks.

33. Utilize latest technology for locating utility lines underground.

Locating water and sewer lines is the largest task in water distribution and sewer collections and can include performing costly investigation to find the location of the lines.

Technology (ground penetrating radar) is currently available that can locate water and sewer lines without disturbing the ground. The County should investigate potential technologies to minimize costly removal or digging.

34. Utilize employee teams in all groups to clearly define activities and work measurement.

The County should develop a list of specific, well-defined activities for maintenance operations and integrate into the new CMMS. The County can focus on the "critical" activities identified using the concept of Pareto's Law. This process can be used to improve operations and increase the accuracy of work tracking. The County can also utilize the established employee teams to identify the initial key activities and associated work units.

35. Establish work methods with employee teams for crew size, method, and anticipated accomplishment with facilitation for benchmarks.

The Divisions currently communicate the general work guidelines verbally for the maintenance activities. Documented performance guidelines should be developed for each activity with input from a team of County employees. This information would serve as a resource for all of the work planning, as well as providing the additional benefit of common terminology, a device for training, and a tool for continuous improvement.

The guidelines should be made available to all maintenance staff and annually describe how they will be used.

36. Establish activity based system that meets the needs of Solid Waste and integrates with future CMMS.

Currently the work tracking system utilized by the Solid Waste division is mainly to ensure compliance and effectiveness.

Activities and work methods should be established for Solid Waste utilizing Pareto's law. Once activities and work methods have been established, they should be integrated into the CMMS to allow for activity based work tracking and for future analysis of workload.

37. Utilize other alternate cover materials for Solid Waste at the Landfill in addition to mulch to maximize each cell capacity.

Currently the County's Solid Waste department utilizes dirt and mulch as ground cover. The County has recently purchased a tarp as an alternate cover but it is not being utilized. The County should utilize the tarp or other alternative covers which will minimize the need to haul dirt and material storage in each cell. In comparison to other benchmark agencies there appears to be an opportunity for storage of more solid waste material per cubic yard of airspace.

38. Purchase equipment technology for compactors to optimize cover and monitor compaction and grade.

Currently, placement of cover is being estimated manually by operators. There is technology available that can perform these functions to a greater level of accuracy of compaction rate and cover depth.

The County should investigate use of this technology in the immediate future.

39. Utilize only established rates for billing and contracts and eliminate ability for managers (i.e. MC) to determine own rates. Mosquito Control should bill using standard overhead rates.

Currently, not all of the divisions are utilizing rates that have been established by Public Works' fiscal manager. Some rates are being created by division managers. The County should only utilize rates calculated by the Department's fiscal manager. If incorrect rates are used, the County may not recover the full cost of doing business.

LAC observed in contracts that overhead was being applied erroneously. This is costing the County between $300,000- $500,000 annually in billable work to other agencies.

40. Determine standard overhead rates for all operations. Reduce the number of overhead rates (22) to a more manageable range of 8-10 and into three categories by department with consideration for additional rates for both MC and Solid Waste.

The County should establish standard avoidable and full overhead rates for all of Public Works. The County is already calculating avoidable and full overhead rates for each

division of Public Works. This method is accurate in allocating overhead costs and reimbursements to division but can be confusing for the divisions to utilize.

It will be difficult to find one CMMS system that could accommodate the current number of overhead rates (22). The number of overhead rates should be reduced to a more manageable number of 8 to 10. These overhead rates should be reviewed and updated on an annual basis in the CMMS.

41. Develop pre-established full allowable FEMA rates.

The County should develop additional rates for FEMA that allow for all costs. The County has FEMA rates but it appears they could be higher. The FEMA rate should be based on two fringe benefit rates; one for regular time and another for overtime. These rates need to be determined annually and have the capability to be modified to comply with federal requirements while permitting the full amount allowed by statutes.

42. Confirm inventory material control cost for utilities and if accurate, establish a more cost effective control system based on 20-80% Pareto's law.

Material inventory control overhead is generally between 10% and 20% for every dollar of material owned. Currently, all Public Works divisions, with the exception of Utilities, are under 15% overhead.

If it is determined that the material overhead rate for Utilities is accurate, efforts should be made to reduce and/or eliminate unnecessary material support or inventory. A system should be established to monitor and focus on the inventory utilizing Pareto's law.

43. Stormwater assets should be defined and staff educated on ownership.

The ownership of stormwater assets is in question. Ordinance 92-89 states that stormwater assets are "components which provide for collection and disposal of stormwater." Currently, there is some confusion as to which assets are maintained by the stomwater group and stormwater funding, and stormwater assets that are maintained by the Road and Bridge Division.

As a result, there is potential for funding to not be properly allocated and similar assets maintained at different service levels. Stormwater assets should be clearly defined along with ownership responsibility.

44. Implement one simplified project management system for all groups throughout Construction Engineering and link to GIS. The system should focus on cost and schedule and be utilized for CIP. Fully automate and systematize work assignment and coordination.

The Construction Engineering Division is organized with several groups and each having their own format for compiling data and monitoring projects. This can make information difficult to compile or determine the status of a project worked on by several groups.

The project management system will need to be able to link to GIS. The system should be fully automated and focus on scheduling work and projects and providing project cost and status reports. This will enable the even allocation of work load to ensure there is sufficient resources and funding available.

45. PMS should be managed by Construction Management and used for candidate selection with other staff such as Road and Bridge and Project Management having input in final project selection. PMS should be linked with GIS and process established.

The County is currently in the process of collecting data and compiling a PMS. Since the capital improvement program is managed by Construction Management, and the PMS will be used to identify projects for the Capital Improvement Program, it would be most beneficial for the PMS to be managed by Construction Management.

The information in the PMS will be a valuable tool in prioritizing pavement needs and assessing which roads have the greatest need for rehabilitation and maintenance.

Organizing

46. Assign Administrative group in Public Works to be responsible for overall new CMMS operations and monitoring along with the related performance plan update including overheads. Provide support and training for all users to become internal monitor of performance and analysis.

The CMMS will require both annual maintenance and update. The administrative group should be responsible for consistently updating the system with the proper information. The administrative group should also be responsible for assisting the divisions in developing and updating performance plans in the CMMS. Lastly, the administrative group should internally monitor the performance data and analysis. All of this will ensure data is being entered accurately and in a timely manner by all divisions, and allow for a continuous improvement process with quality control and accountability.

47. Water distribution requires additional support and the specific amount should be determined from a performance plan. Water production staffing appears to be adequate. Distribution preventative maintenance activities should be established and adequate staffing allocated.

The initial benchmark comparison shows an inadequate amount of labor resources assigned to water distribution. Based upon the activities being performed, the crew size of each activity, the inventories, and service level, the plan can determine how much labor, equipment, and material are needed to meet the needs of the County.

Preventative maintenance can increase the life of an asset and reduce the cost of future maintenance. A preventative maintenance program of flushing and value turning and leak detection is needed. Once a PM program is established, the performance plan should be utilized to determine staffing needed to meet the needs of the plan.

48. Utility distribution staffing requirements should be correlated to installation of more residential backflow devices for reclaimed water. Consideration should be made for additional charges for service with funding mechanism established.

The County provided customers the ability to purchase reclaimed water. Reclaimed water requires the installation of a backflow device to ensure that reclaimed water does not contaminate clean water and other areas within the resident's home. As a result, there is additional work including installation and monitoring.

To ensure the County is properly reimbursed, they should consider an additional charge for installation of backflow devices and monitoring. This will also ensure that proper funding is established for the backflow program.

49. Continue to use contract meter readers and evaluate outsourcing other more manual related support tasks such as meter installation after the CMMS is installed.

The County's contract cost per meter read was lower than other agencies that perform meter reading in-house. The County should continue to use contract meter readers. The County should also evaluate the opportunity to perform other non-skilled support tasks by contract such as meter installation.

50. Confirm need for the staff resources assigned for internal design production capability of over $3-4 million. Consider reallocation of resources to more cost effective functions.

Currently, in the project management groups of construction engineering there are nine employees for production that have the capability of over $3-$4 million in design production.

This appears to exceed existing internal needs. The County should consider reallocation of these resources unless this group can annually produce projects with a value of $3-4 million.

51. Establish process for allocating projects evenly among project managers and utilize designer as small project manager.

Current staffing for the Design and Project Management staff of the construction engineering division does not appear to be evenly distributed. Based upon information

observed by LAC, one project manager was responsible for 31 projects while the remaining three project managers were responsible for 2, 6 or 10 projects.

The project management software should determine project mangers' availability and distribute the workload evenly. Further, a designer could be utilized as a project manager for small projects.

52. Consider transferring Stormwater to an independent separate operating group outside of Utilities.

Stormwater currently utilizes a combination of Road and Bridge, mosquito control, and contract resources as staff. Stormwater operation in many agencies is separate because it often has unique functions with an independent funding source. Separating the operations will eliminate the need for initial billing, establish accountability and consolidate all of Stormwater operations under one group.

53. Consider transferring ditch cleaning capabilities of Mosquito Control (MC) to stormwater as staffing is high for MC as a result of non-typical functions.

Current MC staffing indicates 0.93 employees per every 10,000 residents. This is higher than other MC agencies which average 0.83 employees per 10,000 residents. The County MC appears to perform atypical functions including vegetation control and ditch cleaning support.

The ditch cleaning group in MC should to be transferred to the newly established Stormwater Utility group. This will ensure accountability as the function of the division is directly related to the work.

54. Mosquito Control should identify and only work in those ditch facilities in which it has authorization to perform maintenance or paid to perform those tasks.

The County is performing work in ditches where no contract exists based upon direction of Stormwater and/or Mosquito Control management. The County should identify exactly which ditches it has authorization to work in, since, that work is not reimbursable and utilizes County funding for non-County work. This type of resource allocation to non-County work should not occur without some assignment by the Board and/or County manager.

55. Traffic should focus on traffic signal operations and traffic studies with managers selected based on skills needed for maintenance, operations and design functions.

The Traffic division should focus on traffic signal operations and traffic studies, which are the expertise of the County traffic engineers or obtain staff with more operational background.

Current management and staffing experience is with Traffic planning and engineering. Future management employees should be selected based upon skills needed for understanding maintenance, operations, and design functions.

56. Traffic sign and signal staff should be allocated throughout the County with resource allotment to the west side where the larger amount of County assets exists. Consider utilizing other staff, such as mowing, for sign support during the winter off season.

Currently, the traffic crews stage out of the Holly Hill barn, yet many assets are located in the southwestern portion of the County. By having some crews in the west and the east, travel time will be minimized and productive time increased.

The sign staffing is lower than benchmark averages and should be evaluated based upon the performance plan. There appears opportunity to supplement sign employees by utilizing other County staff during the off-season to assist low-skill sign maintenance work.

57. Future Traffic staffing levels should be based upon County's assets and those of agencies under contract.

The Traffic Division performs contract work for cities and other agencies. Not all of these agencies have formal contracts with the County, as most work is done verbally and by historical understandings.

The County should establish formal contracts with these agencies and use this revenue to allocate the work. Also, monies collected by Traffic should be allocated to the budget used in the work.

58. Consider use of staggered schedules at Solid Waste to eliminate scheduling of standing overtime, to minimize overall use of overtime and meet needs outlined in Performance plan.

The workload at Solid Waste varies throughout the day yet most operational staff start at a similar time. The result is that considerable overtime is required and is scheduled. Other agencies vary the work schedules to minimize overtime and have staff available at peak workload times.

An opportunity to minimize OT can be staggering schedules based on the daily and weekly workload. If overtime is necessary, it should be used in emergency and a non-scheduled manner.

59. A dedicated bridge crew should be assigned for bridge PM for both fixed and movable bridges. Routines need to be developed for both functions.

Current preventative maintenance tasks for movable and fixed bridges are minimal; there is no staff dedicated to preventative maintenance for bridges. Repairs are generally performed on an as needed basis. Routines can be created utilizing the information in bridge inspection reports. Once routines have been established and documented, a dedicated crew should be assigned to completing the routines.

60. Administrative support in traffic should be assigned by function and report to various supervisors.

In the Traffic Engineering Division, the Administrative support is a separate group with conflicting operational responsibilities. Often this group will provide direction to supervisors on how work should be tracked and performed, thus creating conflict between supervisors experienced in how to perform the work and administrative staff that are trying to meet the data requests of their managers.

This can be reduced by assigning administrative staff to report directly to the function they assist. This will ensure accountability and teamwork to accomplish maintenance operation.

61. Transfer the sign and marking function in Traffic to the Road and Bridge and allocate staff to both east and west yards based on assets.

Direction for signs and markings is mainly internal. The work as mentioned for signs and markings is currently distributed throughout the County yet the crew is stationed out of the Holly Hill barn. The signs and marking group often coordinates with the Road and Bridge division. The County should consider transferring the signs and markings group to Road and Bridges and stationing staff throughout the County. This would allow more immediate response and support from Road and Bridge for peak needs.

62. Continue the Utility practice of utilizing a cross-trained distribution and collections crew.

The County is performing the innovative best practice of utilizing one cross-trained crew for both water distribution and wastewater collections work. This practice reduces the need for employees on call out.

This practice should be continued and cross training applied to other groups where applicable. For the distribution of work throughout the County this is one practice that allows work to be effectively done.

63. Reduce span of control and establish two senior staff reporting to Mosquito Control Director.

At the beginning of the study 15 employees were reporting to the Director of Mosquito Control which exceeds good business practices. An optimal practice is having 8 or less direct reports.

The County should consider dividing operations having two senior staff report to the Director of Mosquito Control with one for managing operational components and two for support services.

64. Allocate administrative staff equally throughout the Department matching organization structure. Shift Mosquito Control (1) and Traffic (1) to newly established Stormwater group and Road and Bridges to account for shift of both the ditch cleaning and the signs and markings crews.

There is an inequality of administrative staff distribution among the various divisions. The Road and Bridges group, which has the greatest number of employees and must perform data entry into the TIS system, has administrative staff equivalent to 4% of their total staff, while Traffic Engineering, Water Utilities and Solid Waste have much greater.

In conjunction with Recommendation 61 and the implementation of the CMMS system, the signs and marking staff should be transferred to Road and Bridge. As a result, one administrative person from Traffic Engineering should be transferred to Road and Bridge and be responsible for performing work for the signs and marking group.

Once the recommended transfer of the MC ditch cleaning group to a separate Stormwater division occurs, the MC Division should incur less administrative work. In addition, the County is consolidating the Mosquito Control Division from two to one yard. As a result, one administrative person should be transferred to the newly established Stormwater division to assist with the daily entry of work, monitoring service requests, and to assist with billing.

65. Develop succession planning program. Assign key management staff in the Drop program to alternate positions to develop and mentor replacement staff near the end of Drop program.

Many key employees are approaching retirement and have committed to a Drop program to retire in five or less years. The County should develop a succession program for key management positions in the Drop program.

The County should consider using the Drop program employees to mentor replacement staff taking over responsibilities of their position. This will allow a smooth transition from the existing to the new employee, maintain service levels, and have little impact on customers and employees.

66. Evaluate the assignment of the location of Transportation Planners.

Engineering has two planners. The benefit of these planners being in Public Works seems minimal. The skill sets and work tasks are more related to departments who review and perform high level planning. The County should consider transferring the planners to planning functions.

67. Consider integration of Utility Engineers under Construction Engineering and at a minimum utilize the same project management system.

The Utility Engineers focus on utility assets and Construction Engineering focuses on Road and Bridge assets. The County should consider the integration of these two groups. The groups can assist each other in planning and monitoring the progress of work. LAC also recommends that both groups utilize the same project management system. If the engineers are not placed in the same group, they should both use an automated project management system and other technical tools such as CAD and GIS.

68. Mosquito Control should participate in fleet leasing program if it is economically justified.

All divisions of Public Works with the exception of Mosquito Control participate in the Fleet leasing program. Though Mosquito Control group has some specialized spray equipment that is difficult to lease, there appears to be an opportunity to lease equipment, especially pickups and heavy equipment, through the Fleet Program.

69. Establish an internal service fund. Fleet should manage and own all equipment and rent/lease back to divisions. Establish life cycle costing to allow for optimal replacement of fleet and link to a replacement fund.

Currently, each division is responsible for purchasing the equipment it needs. The division must budget for equipment annually as a capital purchase. An opportunity exists to establish an internal service fund for fleet which each division pays into annually for equipment replacement. The result is a more uniform yearly expenditure for the Fleet vehicle replacement program.

The fund should reflect the actual useful life expectancy of vehicles and should be linked to the replacement fund.

70. Fleet should bill based upon actual year expenditures incurred rather than prior year.

The Fleet Department should bill based upon actual year expenditures. The current system of billing results in departments having no incentive to reduce fleet as they would not achieve any savings that year. It also reduces the relationship between mechanics work and the actual expenditures. To ensure proper allocation of cost, the charges should be based on actual expenditures for the current year.

71. All divisions should use CMMS to monitor equipment "out of yard" usage. Annually calculate fleet rates by class utilizing actual charges and update in the new CMMS.

The CMMS should be utilized to track "out of yard" usage. Methods to determine equipment rates should be developed for consistency using all costs such as repair, maintenance, fuel and lubrication, and replacement. Fleet Maintenance should adopt the methods outlined in APWA's *Shop Rate Guide* (Crandell, Dale E.; American Public Works Association, 1998).

The administrative group should update the equipment rates in the CMMS annually and use them for tracking the cost of equipment to a job.

72. Confirm low usage equipment for 100+ vehicles within Public Works. If warranted, consider disposing of unneeded or low use equipment. Annually monitor low use and high unit cost with fleet to determine if such vehicles are warranted.

Many pieces of equipment are below NAFA averages in both usage and age. Some equipment is needed even though meters do not indicate high use, however, some has low usage and should be evaluated for its overall value to the maintenance operation. The identified low-use equipment should be checked for readings and a unique need that cannot be met through leasing, borrowing, or contract. If valid, the County should consider trading or disposing of non-essential equipment.

73. Train on the use and interpretation of data from Fleet and provide feedback data's accuracy. Assign key staff role as fleet coordinator for PW to ensure use of this information.

The Fleet Department uses the Faster system for tracking and monitoring maintenance on vehicles and the maintenance cost. Public Works is not currently utilizing this information on a regular basis.

All divisions of Public Works that utilize vehicles should understand and utilize the Fleet data. Key employees from each division should be responsible for coordinating with the Fleet Department to receive data.

74. Utilize appropriate equipment for sewer cleaning whether in-house or contract support.

The small VAC trailer utilized for cleaning sewer lines is a response vehicle. Once the County implements a routine sewer cleaning program, a large VAC truck will be a more effective tool at removing debris and roots from sewer lines.

75. Develop a borrow site plan for the Landfill. Once travel is minimized, match haul units to the new borrow site plan.

Haul distances for cover dirt are increasing due to location of borrow sites further from cells. A plan for current locations and future locations of borrow sites should be

established to minimize travel time. Once an optimal plan is determined, the appropriate number of haul trucks can be allocated.

76. Utilize performance budget to annually determine equipment resource needs. For example, Solid Waste should match number of haul trucks to the need.

A performance based budget can be utilized to estimate resource/equipment needs. Optimizing the number of equipment pieces needed to the equipment owned will save the County in expenses.

The County should optimize their work plan by developing a borrow site plan that indicates where future borrow sites will be located. Once travel time is minimized through the borrow site plan, Solid Waste should optimize the haul units needed by utilizing a performance based plan from the new CMMS.

77. Consider use of SCADA for monitoring Solid Waste gas and leachate collection equipment.

Technology exists to allow for monitoring of flow, pumps, and valves. Several benchmark agencies use technology such as SCADA. The County should evaluate the use and plan for this technology to allow a cost effective way to evaluate the Landfill systems.

78. Establish better tracking for helicopter system. Utilize cost with avoidable overhead for charges to other groups within the County for their use.

The County tracks all helicopter usage on manual logs, but did not appear to match when compared to the actual helicopter meters. The County should track and store flight time and usage in an automated system and annually calculate the hourly cost per flight hour.

In the helicopter logs, the County tracks administrative flights that were flown for other Departments or County entities. These departments should be charged the actual cost of these flights.

79. Evaluate the need for two helicopters and compare in-house cost to contractors.

Initial information indicates the cost per hour is within range of other agencies and contractors. Due to the high cost, the County should evaluate the need for two helicopters. Utilize a performance based budget to estimate resource needs based upon the estimated hours of aerial spraying and the actual hours tracked in the CMMS for one year. After one year, the County should be able to determine if two helicopters are warranted.

80. Establish a process for material control and perform in new CMMS.

Each division of Public Works tracks and stores data in a separate system for material control. This has resulted in different methods for tracking the usage of, how the material is stored, and when it is purchased. The new CMMS system should be used to track and monitor usage of material for all divisions.

Directing/Controlling

81. Develop similar work order and tracking process for all divisions. Customer requests and work orders should be combined for as many systems as possible in the new CMMS with linkage made between Solid Waste WM systems. Replace TIS work order utilizing new CMMS and ensure field for tracking enforcement/illegal dumping issues. Link new CMMS to WM system.

The County currently uses multiple work order systems. The County should establish one work order and tracking process to ensure similar information such as customer, type of request/work order, problem and resolution information is tracked.

A process should be established that has the complaint information located in one system and integrated with the new CMMS. Solid Waste has specific needs for managing work orders and customer requests. The County should work with Solid Waste to determine necessary information needed. Solid Waste utilizes the Waste Management system, and a linkage from the WM database and the new CMMS should occur.

Having one system should result in a reduction of data entry time and improve communication.

82. Standardize work scheduling among divisions and fully develop a 2 week schedule procedure and hold Supervisors/managers accountable. Distribute schedule to staff. Relate schedules to annual work plans and routine processes.

A standardized 2-3 week scheduling process should be instituted. This process would include work by activity to be accomplished in a specific time period based on a developed annual work plan and outstanding service requests. Involvement of project coordinators and supervisors should occur to assist with the equipment, labor, and material needs, methodology, and any special circumstances.

The schedule should be prepared and released for all employees. The supervisors should discuss and compare schedules with the prior ones. The supervisors should be held accountable for the schedule completion.

83. Standardize the work reporting for all with resources used (labor, equipment and materials), accomplishments, and locations documented for all groups. Track all time on job site and link to activities including both the travel and equipment and preparatory.

The County should standardize work reporting to include all resources. This would require standardized reporting by crews utilizing the established CMMS system. Currently, data used for productivity and unit cost measurement is tracked and input into the TIS, AllMax, Primavera and HERB systems, but is difficult to retrieve, calculate, and is inconsistent.

Job site travel time should be tracked allowing for better costing of work and give a true amount of cost spent on work effort.

84. Eliminate duplicate work entry process for Traffic Engineering and enter labor, equipment, material, accomplishment, and work order in new CMMS.

Traffic Engineering is currently utilizing the Primavera system for tracking work. Primavera was originally designed for project management. As a result, some of the information is entered multiple times and some must still be exported into MS Excel to be used for billing.

The new CMMS should be utilized for tracking labor, equipment, material, accomplishment, and work orders. This information only needs to be entered once. The system should be able to produce automated billing. This should increase the availability of Traffic administrative staff, and allow transfer of one FTE to Road and Bridge.

85. All supervisors with Mosquito Control should utilize the same system for work tracking and planning. Specialized needs such as tracking chemical usage and application rates should be established in the new systems or linked to existing systems.

Each Mosquito Control supervisor utilizes a separate system for tracking and information is difficult to compile. The HERB database is used for tracking herbicide spraying activities, Primavera is used to track mosquito control ditch projects, inspector supervisors utilize various MS Excel sheets and aerial work is tracked in manual logs.

Tracking and storing information in the new CMMS will allow information to be compiled in a similar format and allow for all information to help make management decisions and continuous improvement.

86. Utilize new CMMS for establishing similar billing formats for all divisions with ability for some variation.

As a result of each division utilizing different systems for tracking, work billing is also produced from different systems. This can make billing received difficult for customers to understand. The County should utilize the CMMS to establish a similar format for billing with some ability for variation. Standard billing capabilities in the CMMS should include the ability to bill by unit cost or time and material, with the ability to add overhead costs for labor and material.

87. Implement a new CMMS that has the ability to integrate with latest technology including GIS and wireless/mobile options.

The County uses new technologies such as GIS and WiFi and is looking at more wireless and mobile options. The new CMMS should be able to link to these technologies. In the case of the GIS system, two way communications will allow information from the GIS to the CMMS to be transferred. Many job sites are a significant distance from the yards and mobile technology will be needed. This will allow the potential for entry of work orders or daily tracking in the field.

88. All divisions should create a monthly report in a similar format. Establish a monthly a meeting to review data from the CMMS with administrative group responsible for creating an accountability process.

Currently, each division provides a monthly report to the Director of Public Works in a different format. These reports should be in a similar format to allow the Director to review the information as a whole and compile summary information. Further, the reports should be created from data stored and retrieved in the CMMS and include planned versus actual data by activity for labor days, cost, accomplishment, and productivity.

Report information from CMMS should also be reviewed by the Administrative group to provide accountability and ensure information is accurately tracked.

89. New CMMS should meet existing HERB systems functions for Mosquito Control (i.e. application rate).

Mosquito Control has unique reporting requirements for the use of chemicals. Some of the databases, including the HERB database, have been specifically established to meet state and billing needs. The new CMMS should be able to meet these reporting requirement through the use of customizable or "user defined fields."

90. Make information readily available to all employees and train supervisors to utilize. Develop system champions or "super users" in each group. Establish accountability to the planned work and productivity and establish a process to systematically evaluate and monitor unit cost and productivity.

A variety of systems are used by each division and the supervisors have different capabilities and access to data. The new CMMS database should allow management to compile comprehensive summaries of accomplished work (i.e. unit costs, work accomplished and dollars expended). This would create a more business-like approach.

Further, the system information should help management personnel make informed decisions regarding work performed, and this information should be made available to employees.

Those managers utilizing this information to continually improve should be rewarded, and those that choose not to use the information should be given guidance and direction.

A monthly review of work done, work accomplished, and productivity should be compared against desired goals. Staff should be accountable for achieving the goals and improving efforts to perform cost-effective work.

91. Establish a continuous improvement process with a quarterly update given to crews. Provide an annual state of Public Works report to the Director of Public Works that compares planned activities work days, accomplishment, cost, and unit cost versus actual effort. Update County manager with results and provide state of Public Works to BCC.

The County's mechanism is tracked in various automated databases. The new CMMS system will have frequency of service, desired quality and quantity of work and unit cost for all activities that can be extracted on a very routine basis by any specific time frame and/or location. A new activity based system could provide the County with the mechanism to maximize the best use of the public's dollars.

A quarterly meeting should occur where all employees provide summary information on costing, productivity and accomplishment.

Further, on an annual basis information should be compiled for all divisions into a report and provided for the Director of Public Works outlining the results of work effort and compliance to the annual work plan. Once information is confirmed and reviewed by the Director, the "state of maintenance" should be presented to the Board of County Commissioners.

Summary

The recommendations described above were developed by LAC in conjunction with Volusia County Public Work operation, maintenance and administrative staff to improve the maintenance efficiency and effort in a manner that would realize time and fiscal savings and empower of the labor force.

The County has numerous positive actions ongoing. Many of the opportunities are related to system linking the current processes and providing the training to managers and staff for using the improved maintenance system.

The recommendations were categorized to facilitate a phased implementation with assistance in coaching and guiding the completion. Adopting the recommendations would result in considerable positive impacts for the efficiency of work being performed, effectiveness of public dollars being expended, and the increase in morale by the involvement of all staff.

2 – Existing Operations

SECTION 2
EXISTING OPERATIONS
VOLUSIA COUNTY PUBLIC WORK DEPARTMENT

This section outlines the existing Public Works operations for Volusia County, Florida. The *management and work processes* found within the County's Public Works Department for maintenance operations were also identified.

The following topics are discussed in this section:

General Information

- Good Practices and Innovative Ideas
- General Facts

Work Planning and Budgets

- Road & Bridge Characteristics
- Traffic Engineering Characteristics
- Mosquito and Vegetation Control Characteristics
- Water Resources and Utility Operations
- Solid Waste Characteristics
- Construction Engineering Characteristics
- Stormwater Characteristics
- Activities Performed
- County Budget

Resources and Organization

- Organization Resources

Directing

- Work Scheduling/Routines
- Work Requests/Tracking

Controlling

- Systems
- System Use and Users
- Work Processes

A Countywide documentation of current maintenance operations and processes was conducted. The information was compiled from LAC review/interviews, field and office observations, and research of agency documents. The information was supplemented by input from LAC staff that is experienced in both maintenance operations and management systems. Information is presented in general terms, rather than in technical language, for all of these areas.

The County is performing many innovative and good practices. Though only a select group of these are outlined, the County has many positive efforts completed and underway. These have been outlined below by Division.

General

- Employee agreements for training and development- Agreements have been developed with employees that encourage training and development. This promotes positive interaction and growth of employees and can provide employees with skills to improve job performance.
- Overheads rates developed for various uses- The County has developed multiple overhead rates that vary by division. This tool allows the County to recover cost of performing work for both in-house and external work.
- Live Vehicle tracking – Utilization of GPS to monitor precise locations of many vehicles on a continuing basis. This provides the capability for response and emergency and allows for accountability.
- GIS focus and support at each level-The County has staff capable of working with Geographical Information Systems (GIS). Staff are positioned throughout Public Works groups and targeted with the responsibility. Much of the staff works directly with personnel to collect data such as in utilities, administration and roads and bridges. GIS data can be most helpful in locating assets and providing information integral to operations.

Road and Bridges

- Internal work management system in place – Road and Bridges utilizes the Transportation Information System (TIS) system. TIS were developed in-house and track work history and job cost information including labor, equipment, material and work accomplishment.
- Mowing support – An effective combination of contract and in-house staff are used for this function in an effort to maintain quality.
- Extensive use of inmates- The County uses inmates extensively to perform work. Inmates allow for a cost effective method of performing work with limited resources. Work performed by inmates includes cemetery maintenance and concrete work.
- Drainage and Storm water projects – Staff has capability to perform major contract projects from major retention structures, bridge box culverts to complete underground storm sewer systems.

Traffic Engineering

- PM program for traffic signals – A PM program has been established for traffic signals which can extend the useful life of an asset and reduce emergency calls.
- The establishment of readily accessible emergency power supply connection for each intersection allows for immediate response in the event of power loss.

- Conversion of traffic signal lens to LEDS is about 60% complete with plans to convert 100% of the signal lens to LEDS which is saving considerable effort for both maintenance and energy cost.
- Contract support for cities for markings and signs and Traffic signals- Performing contract work for others is a good indication of work quality which meets the needs of others and can create an additional revenue source for the County.
- Traffic centerline Striping – A systematic annual striping program by project has been established allowing for effective maintenance operation by grouping of work.
- Routine sign inspection and work planning by zone- Routine planning and inspections can identify maintenance and repair issues while they are still minor. This can allow a proactive resolution prior to becoming costly to repair. In addition, this can reduce potential hazardous safety issues as signs are routinely inspected and issues resolved in a timely manner.

Mosquito and Vegetation Control

- Multiple equipment for vegetation control- Mosquito Control has specialized equipment that it used to perform its work in a more effective manner. Equipment includes helicopters and air boats.
- Support for non-district Cities – District does work for other agencies on the west side of the County on a contract basis further generating revenue and value to the County.
- Spray Zones on Website with spraying notification- The County website has spray zone notification for citizens located on the website. This allows customers to be aware and educated or potential spray sites and areas where mosquitoes are a concern.

Water and Utility Operations

- Employee agreements where salary adjusted upon completion of training – The Utility division has developed agreements with employees. Upon successful completion of training and certification the employees' salaries will be adjusted. This provides incentive for employees to remain knowledgeable and trained in their areas of expertise.
- Joint use of water and sewer maintenance crews including Sunshine locates– To maximize the efficiency and effectiveness of limited resources utilizes a joint water distribution and sewer collections crew. This allows for pooling of resources and limits needs for additional staff and equipment. This does require additional training to ensure there is no cross contamination of water and sewer facilities.
- Application of SCADA – SCADA is utilized in the majority of pump sites. SCADA allows remote monitoring of sites and can make staff aware of issues that may be occurring without and on-site visit.
- Cross training of staff – The ability of staff to work in both water and sewer allows for effective use of resources. Many staff has both certifications in water and sewer.

Solid Waste

- Utilization of local equipment vendor support – A local vendor is utilized by Solid Waste for equipment maintenance support. This promotes positive interaction with the vendor and allows equipment to be utilized when otherwise not available.
- Use of "woody" waste as alternative cover – This reduces the need for the use of more costly dirt in land fill as well as disposes of this waste.
- Transfer station equipment utilizes multiple attachments – The use of both shovel and tamper on same loader unit reduces the need for both equipment and staff resources. Further, the use of remote gates activated by the operator to restrict and control access supplemented with truck drivers as spotters is most effective.
- Recycle center that allows for extensive reuse of waste – The Solid Waste division contracts out to a recycling center that is on-site at the Tomoka Landfill. Recycling can reduce waste and is better for the environment. The overall County is rated by the State as being one of the top recycle Counties.
- Utilize award winning E-Scale program to track waste transactions at the scale house.

Construction Engineering

- Extensive Plan for Capital Improvement exist with a public involvement program – Public is involved in development of capital improvement plan and projects are designated by impact zone cost. Public education promotes better interaction with the County and its citizens.
- Surveyors have extensive background and are crossed trained – Cross training of surveyors allows them to perform a variety of functions.
- PMs manage both in-house and contract design work – This allows for effective use of resources and ability to meet peaks demands without overstaffing with costly professional staff yet provide in-house capabilities.
- Right of Way staff prepares cost for projects and property – Right of way staff has extensive knowledge of area and property and this allows them to develop accurate costing for projects.
- PMS is being compiled – A consultant has been hired to inventory condition of streets and develop a complete pavement management system in MicroPAVER. Understanding the condition of the County's assets will assist in determining rehabilitation and construction projects that will best prolong asset life and be cost effective in the future.
- Establishment of MS Access system tracking – An in-house database has been developed to assist in project management. The database can be used for monitoring status and of projects.

Stormwater

- A Stormwater Utility exits – County established a dedicated funding source to meet the needs for stormwater maintenance and operations.
- Sharing of resources to meet stormwater needs – Stormwater is performed by multiple divisions. This creates the need for and allows for sharing of resources including staff and equipment to complete the work.

- Minimum staff to manage operations – Stormwater has 2 ½ employees budgeted. The County maintains a considerable number of stormwater assets with minimum staff support via sharing resources.

General County Facts

Volusia County is ~1,260 square miles and located on the north eastern coast of Florida south of Jacksonville. In 2005 the population of the County was 493,000 with concentration in two main areas. One area is on the east side of the County, which has coastal cities such as Daytona Beach, Holly Hill and Ormond Beach and runs along the 47 miles of coastline that make up the eastern border of the County. The second area is on the west side which is rapidly growing and contains the largest City in the County, Deltona along with DeBary and DeLand. The eastern and western portions of the County are divided by a lower density area that creates a corridor that runs north to south through the middle of the County.

The County is home to some major corporations in the County including Hawaiian Tropic Suncare, Boston Whaler Boats and the LPGA.

Population growth for the County from 1980-2005 along with projected population through 2010 was analyzed. From 1980 to 2010 the average population is expected to be 110% or on average 3.7% a year. From the time period between 1980 and 1990 the population of Volusia County grew 43.6% or 4.3% annually while during 1990 to 2000 the population growth rate decreased to 19.59% or 1.96% annually. This rate exceeds the national growth average of 1.3% between 1990 and 2000 per year but is under the state of Florida's growth rate during the same time period of 2.35%. From 2000 to 2005 the population growth increased to 3.62% annually which was similar to the average growth rate of the United States of 3.68% but below the average of the state of Florida, between the same time periods, of 11%. In the future, based upon the County's estimates of population, growth is expected to be 2.29% annually. Population of the County is indicated in Figure 2-1.

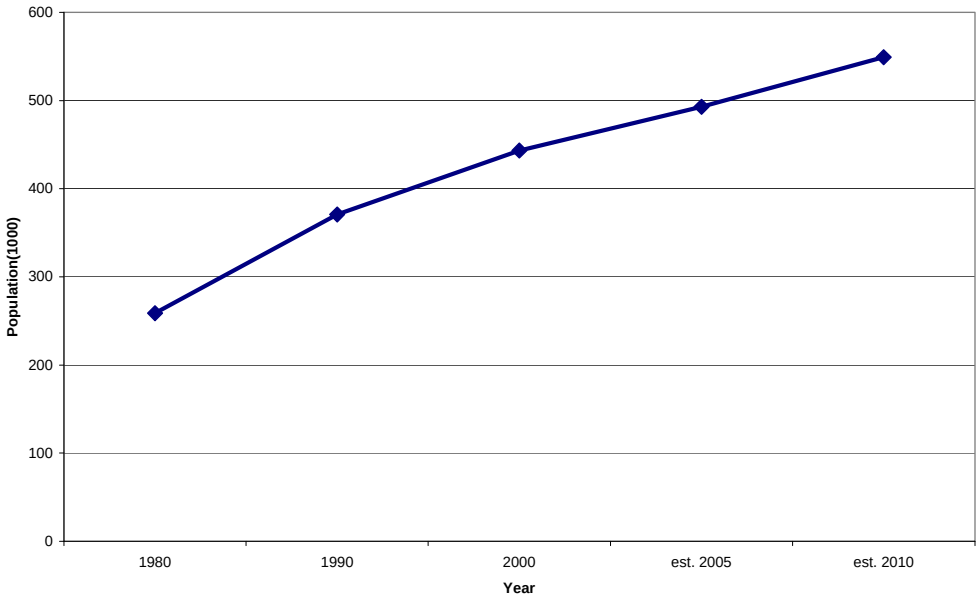

Figure 2-1 - Population Growth from 1980-2010

The largest portion of the population (120,582) entity in the County's population resides within unincorporated County areas. The largest City within the County is Deltona which is located in the south western portion of the County and has a population of 76,332. The next largest City is the City of Daytona Beach with a population of 68,476. Other Cities that are located within the County include Daytona Beach Shores, DeBary, DeLand, Deltona, Edgewater, Holly Hill, Lake Helen, New Smyrna Beach, Oak Hill, Orange City, Ormond Beach, Osteen, Pierson, Ponce Inlet, Port Orange, and South Daytona. Figure 2-2 outlines the general population of these Cities and unincorporated area.

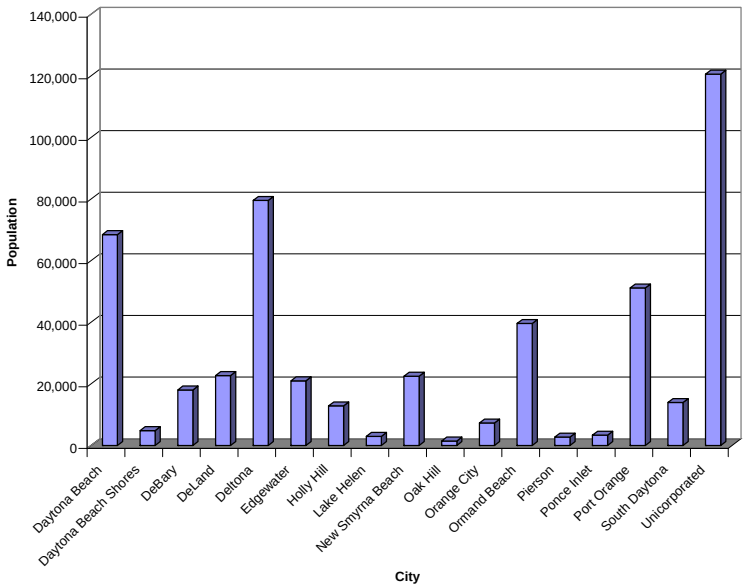

Figure 2-2 - Population by City

The County has several major tourist events throughout the year the impact their operation requirements and are major traffic generators. This impact includes both the addition population served and maintenance work that must be performed. Events include Speed Week, Spring Break, Bike Week, Biktoberfest and Destination Daytona. In an article in the, *Daytona Beach News Journal Online*, on March 12, 2006 it indicated speed week attracts up to 200,000 fans and bike week which occurs over a 10-day period has attracted over 500,000 people. This exceeds the population of the County and creates the need for considerable services for the County in general and Public Works in particular from the special planning, traffic control, debris removal, safety impacting working hours.

Staging Locations

Currently the County has 14 sites or yards which employees report to work and stage their work resources. In addition to the staging locations the County has several additional facilities including water/wastewater facilities which have no direct report but have daily inspection or site visits.

The various staging or yard locations (Barns) are outlined by color in Figure 2-3. The yellow stars indicate all of the staging facilities for Road and Bridge which has three facilities: Deland Yard on route 44, the Osteen Yard in the City of Osteen and the Holly Hill Yard in the City of Holly Hill.

The blue stars indicate the site of a water or wastewater facility. One of the Facilities is located at the same location as the Road 44 Barn. The remainder of the sites are spread out throughout the County with a regional plant located in the Southwest region. Mosquito Control sites are demonstrated by the two red stars on the map with one in Daytona Beach and the other in New Smyrna Beach. The County has indicated the facilities may be combined in the future. Solid Waste has two facilities as demonstrated

by the green stars. The transfer station is located at the intersection of 44 and 4 and the Tomoka Landfill is located in the eastern portion on the County.

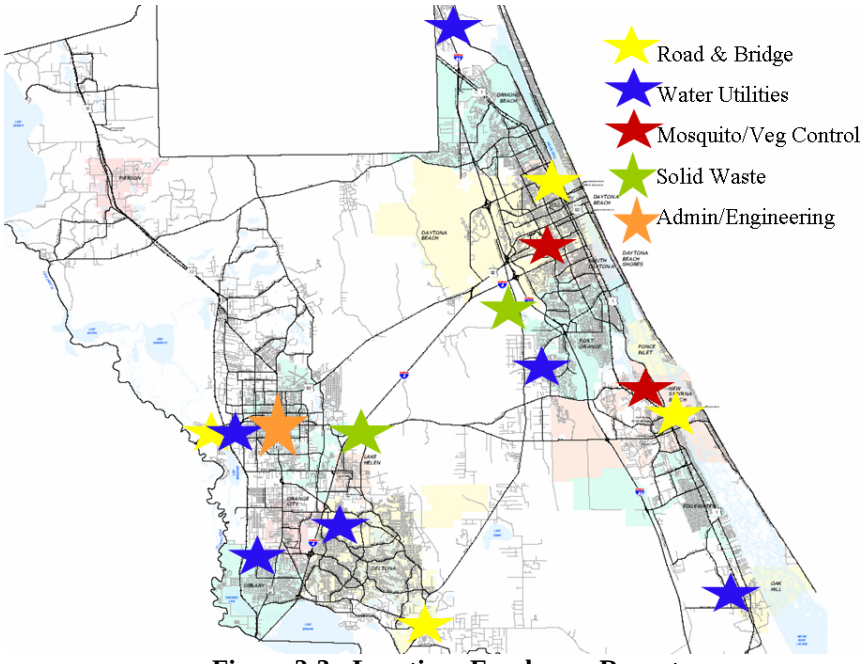

Figure 2-3 - Locations Employees Report

Road and Bridge Characteristics

The Road and Bridge Division maintain a roadway network of 930 paved centerline miles as well as 139 dirt road miles. The road assets in rights of way includes in addition to the pavement features such as 157 miles of sidewalk, 367 miles of roadside ditches, 2,809 acres of shoulders, 264 miles of pipe, and 15 miles of catch basins. Road and Bridge also maintains other assets such as 15 cemeteries, 183 acres of retention basins, 48 fixed bridges and 3 bascule bridges.

Road and Bridge (R&B) operate from four locations, or barns as indicated in Figure 2-4. Work is performed from the 44 Yard, the Osteen Yard, the New Smyrna Yard and the Holly Hill Yard. The 44 Yard in DeLand is the largest of the maintenance yards with 55 R&B employees staging daily which services the west and northwest sections of the County. The Osteen Yard stages nine R&B employees and services the southwest section of the County as well as one road in the furthest southeast reaches of the County. The New Smyrna Yard stages ten R&B employees and services the southeast section of the County. The Holly Hill Yard stages 28 R&B employees and services the northeast section of the County. Some crews do not report to these barns such as the inmate supervisors who report to the corrections facilities and the bridge tenders who report directly to the bridge. The east tree trimming crew reports to either the Holly Hill Yard or the New Smyrna Yard depending upon the work locations.

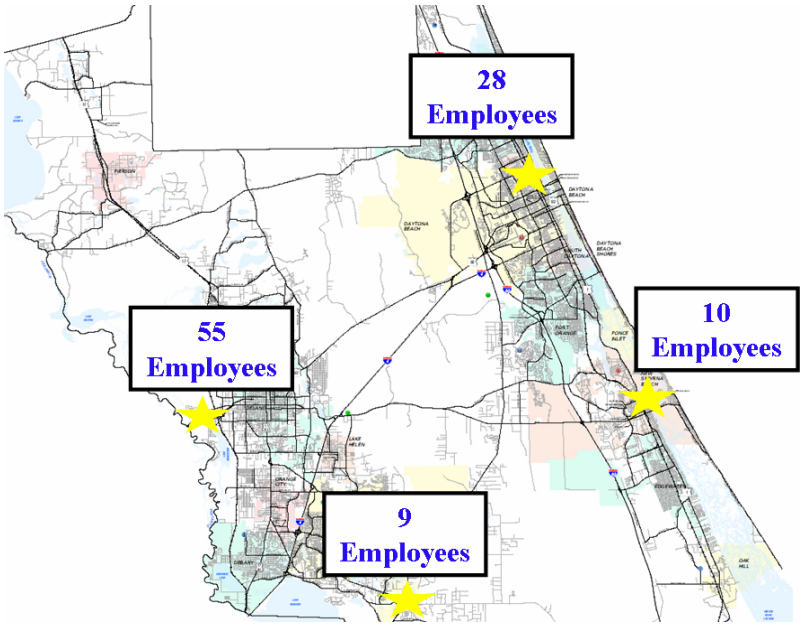

Figure 2-4 - Road and Bridge Locations

The number of employees staging from each barn vary as does the amount of centerline road miles maintained in each area. The number of road miles per area is shown in Figure 2-5. The northwest (44 Yard) has 491 miles of road which is 46% of the total. The southwest (Osteen Yard) has 133 miles (12%), the southeast (New Smyrna Yard) has 189 miles (19%) and the Northeast (Holly Hill Yard) has 253 miles (24%).

The work is generally assigned daily with some work planned on routine cyclical schedules. Much of the work is funded through various contracts. Road and Bridge has contract agreements with many of the City's within the County including the cities of DeBary and Deltona for mowing, tree trimming, drainage, road and road right of way maintenance. Work pertaining to the stormwater system is either fully reimbursable or half reimbursable depending upon the project.

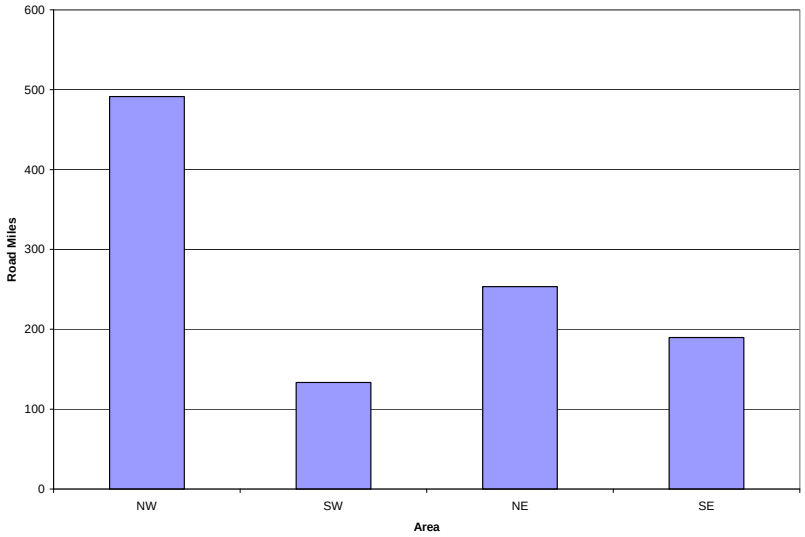

Figure 2-5 - Paved Road Mileage by Area

Mowing is performed on a routine cycle for the County and for contract cities throughout the year. Mowers stage from each of the four barns. Most mowed road shoulders are mowed four times a year with the thoroughfares mowed eight times per year: a combination effort four times per year by the County and four times by a contractor.

The County sets up special mowing projects with contract cities during seasonal events such as NASCAR auto races, Bike Week, or Oktoberfest. In the FY2005-06 the County mowed 2,809 acres throughout the entire County and for contract cities. Figure 2-6 illustrates the amount of mowing performed by each barn over the course of a year. The Northwest (44) Barn performed the most mowing with 1,254 acres mowed, which is 44% of the total mowed acres. The Northeast (Holly Hill) Barn mowed the second most with 779 acres followed by the Southwest (Osteen) Barn with 409 acres and the Southeast (New Smyrna) Barn with 367 acres mowed.

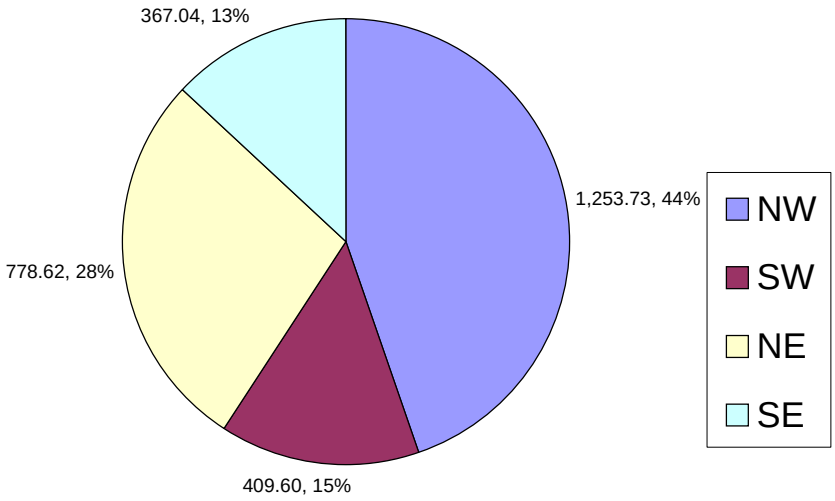

Figure 2-6 - Mowing Acreage by Area

Inmate Crews

The County uses inmate crews for multiple functions. The County inmate supervisors report each morning to the corrections facilities and pick up between four and ten inmates. The ten inmate crew is used exclusively for weed eating for retention ponds and other stormwater facilities. Tasks for other inmate crews include litter pick up, sodding, weed eating, mowing and sidewalk maintenance. Sidewalk maintenance includes the skilled work of pouring sidewalk.

Bridges

The County currently maintains 51 bridges. Bridges are normally maintained by a specific one four person crew in the Northeast Holly Hill Barn. Most of the Bridges (31) are made of pre-stressed concrete. Nine bridges are made of concrete, five of steel, four of continuous concrete one of pre-stressed continuous concrete and one of wood or timber (Figure 2-7).

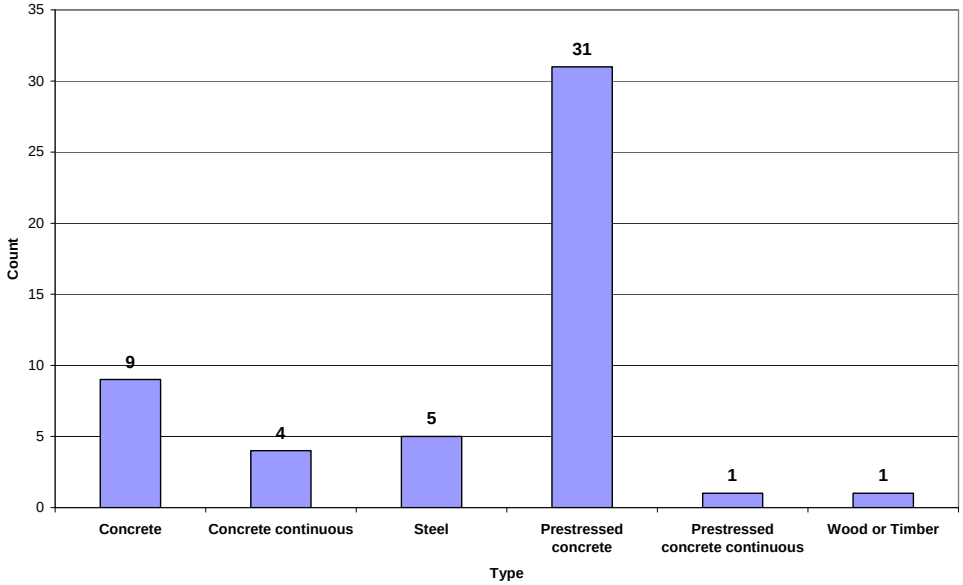

Figure 2-7 – Bridges by Material Type

Most of the County bridges are fixed. As illustrated in Figure 2-8, the County maintains twenty slab design bridges, eleven channel beam bridges, nine box culvert bridges, eight stringer/multi beam/girder bridges, and three bascule bridges. Work performed on the bridges is limited. The bridge crew from the Holly Hill Barn performs very little planned maintenance on the fixed bridges, and does provide a limited amount of preventive maintenance on the mechanical functions of the bascule bridges. Preventive maintenance is performed on Fridays while the crew performs other non bridge related work during the rest of the week. The crew performing Bridge maintenance is also the same crew responsible for stormwater capital projects.

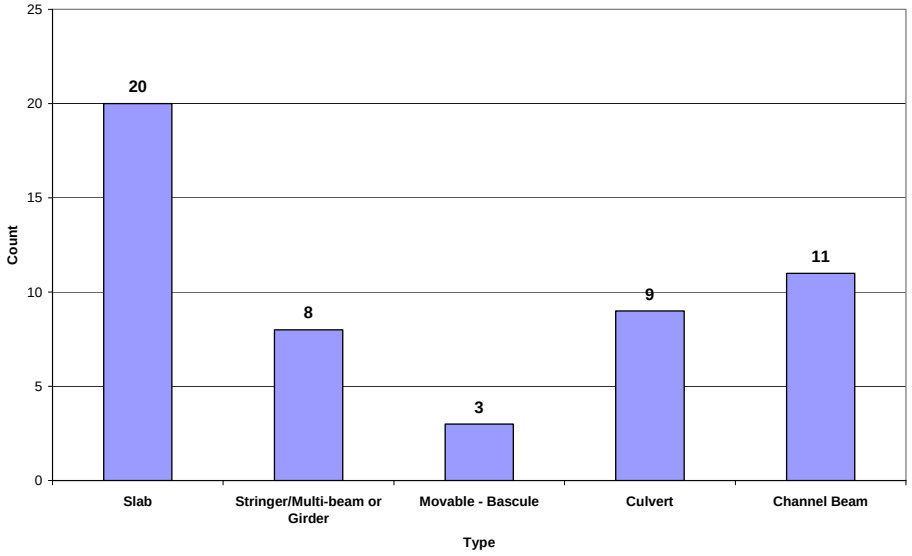

Figure 2-8 – Bridge by Design Type

Dirt Road Program

In 1998 the County maintained 227 dirt road miles with many roads graded on a ten working day cycle. A program was established to pave dirt roads during the FY1998-99, to 2006, the County has paved 92 miles of dirt roads with maintain 135 miles of dirt roads remaining.

The improvement process is a combination effort. Road and Bridge grades and preps the road for paving and has a contractor pave and finish the roadway. Road and Bridge inspects all cold paving work and Construction Engineering inspects all hot paving work performed. Figure 2-9 shows the annual cost for the dirt road paving program. The amount has varied and has averaged over $1.5 million per year.

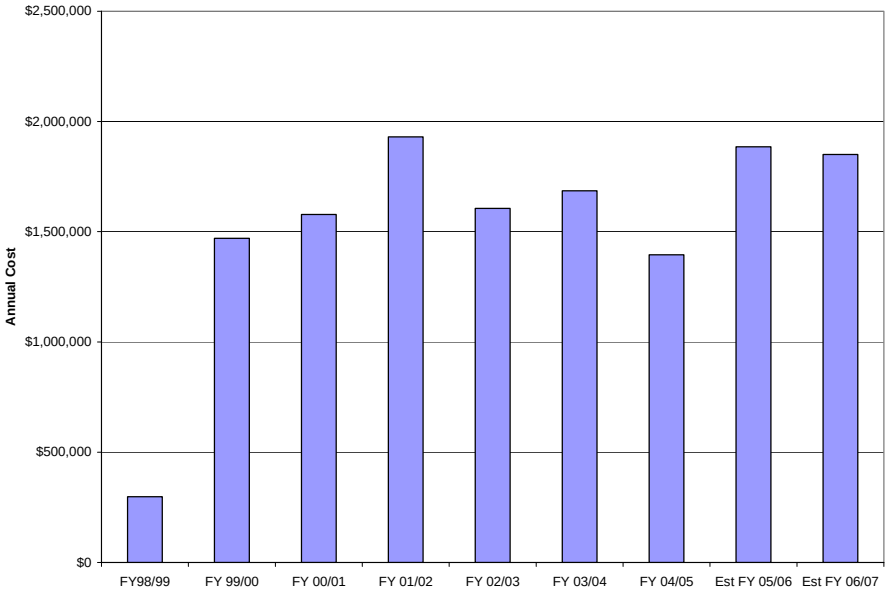

Figure 2-9 - Dirt Road Program Historic Costs

The cost per mile paved in the dirt road paving program is shown in Figure 2-10. The costs per mile have varied from $75,000 per mile to $145,000. Fiscal year 2006-07 is anticipated to have a cost per mile of almost $200,000.

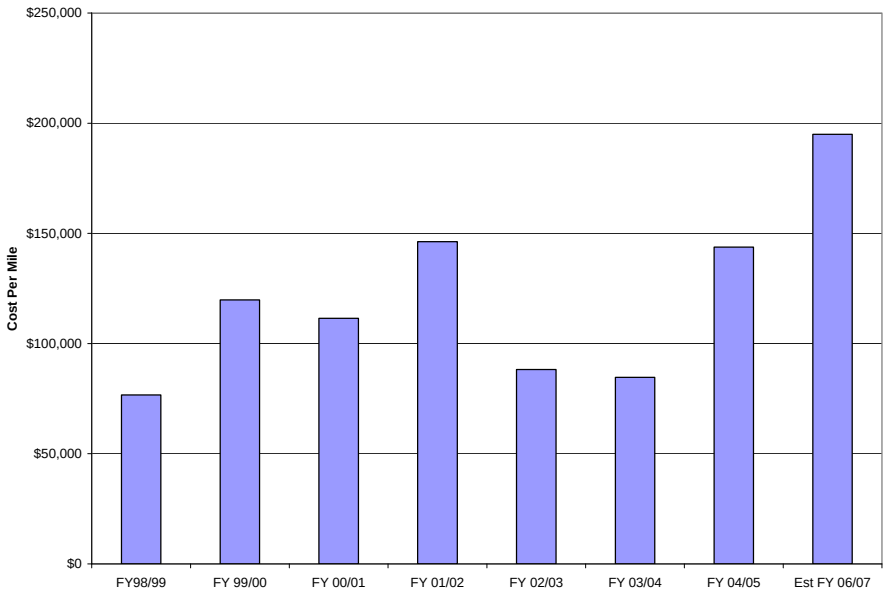

Figure 2-10 - Dirt Road Program Cost per Mile

Condition

The County has condition rating on both bridges and pavement. Bridge condition ratings are performed using visual inspections mandated by the State of Florida following federal criteria. Condition inspection ratings are performed though contractors working for the State. The reports completed are filed for documentation by engineering and future verification of other condition evaluations. The scale of the ratings is zero to 100 with 100 being a new standardized facility. The current average condition rating for all the fixed bridges is 84 and the rating for the four movable bridges is 54.

Pavement condition ratings are the responsibility of Construction Engineering, which had previously been performed by an experienced inspector in Construction Engineering and ratings were based upon visual inspections for general conditions. The County has recently implemented the MicroPAVER System and now collects condition data based on the ASTM standards utilized by the MicroPAVER System. Ratings are now being performed by KMS consultants who are populating the initial MicroPAVER database under Construction Engineering.

Traffic Engineering Characteristics

County Traffic Engineering group is responsible for all roadway traffic markings, signs and signal operations for the County and also has the related engineering and planning support for those traffic functions. They maintain and operate 414 signalized intersections, 55 flashing beacons and 54 flashing school beacons/signs. The County maintains traffic signals for 13 of the 16 cities within the County on a contract basis as well as FDOT signals on state roadways.

Traffic Operations Group is divided into several separate functions; traffic signals, traffic signs/ markings, engineering, planning and administration. The first two are in charge of the operational arms of the group. The County maintains and operates signals for 13 cities within the County. Two of the cities Daytona Beach and Deltona maintain their own signals. Cities maintained by County include Ormond Beach, Holly Hill, and Daytona Beach shores, South Daytona, Port Orange, New Smyrna Beach, Edgewater, Orange City, DeLand, DeBary, Lake Helen, Pierson and Oak Hill. 294 of the signalized intersections are actually County signals. A breakdown by ownership is shown below in Figure 2-11 depicting wide number of owners for the other 120 signals.

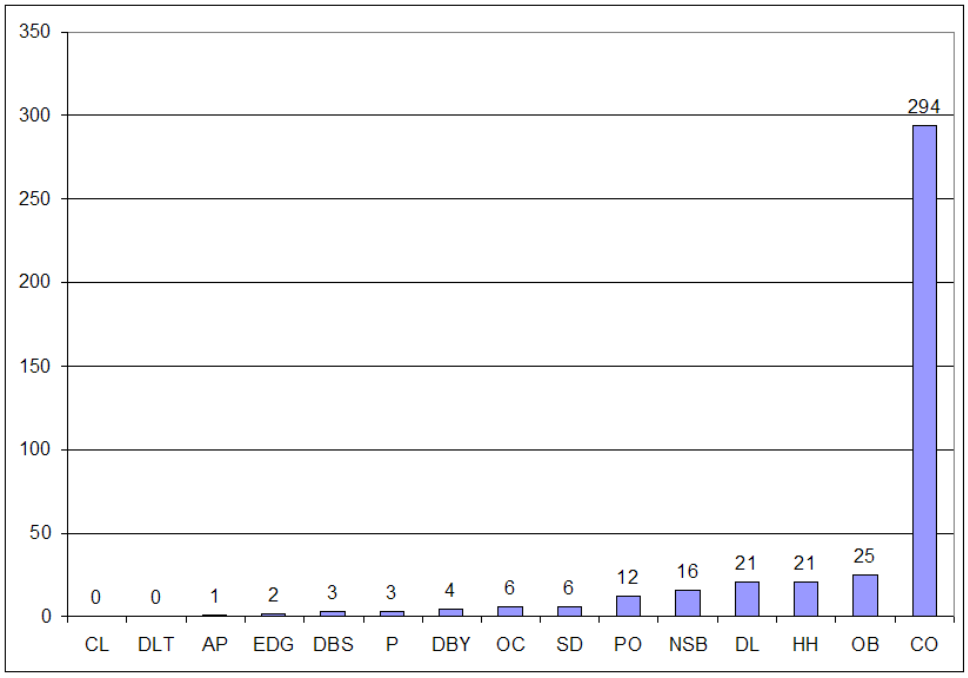

Figure 2-11 - Signal Owners

Though most signals being maintained are owned by the County, these signalized intersections are located throughout the County as many of the County roads are within the Cities boundaries as well as FDOT signalized intersections in which the County is responsible. The graph below shows this mix (Figure 2-12).

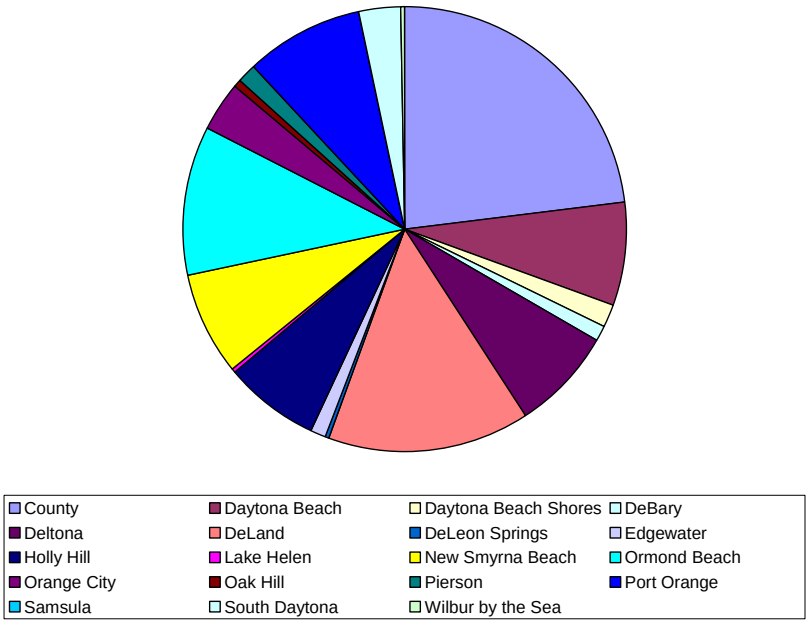

Figure 2-12 - Signals by Location

The County uses video monitoring of signals by two systems and monitors signal operations using a DOS based system that allows for remote traffic signal timing MS Access and setup. Traffic signal staff also supports inspection for new signals, sunshine locates and design support. The TRANSYT signal controllers and related software support that are used on the entire system yet they are no longer being supported by a manufacturer and are repaired by capable County staff with parts cannibalized and obtained from unused monitors. Traffic Signal Systems Supervisor with technical support prepares construction plans, reviews FDOT and other plans, optimizes and analyses new signal timing, updates signal timings, and performs traffic signal related studies.

The Traffic Operations (Signs and Markings group) is responsible for signs and traffic control markings along the 930 miles of County Roadway as well as on a contract basis for City of DeBary. Most signs are fabricated on site using two sign computerized systems for faces layout. A detail inventory of signs on roadways is lacking. A GPS tracking system of signs locations is currently underway using the sign staff and video logging contract. The County has 930 miles of centerline roadways, yet lacks a complete markings inventory. Centerline work is performed by in-house staff with most of thermoplastic markings and legends being done by contract basis.

Considerable effort is expended by traffic operations in support of special events such as Bike Week and NASCAR auto racing events mainly for traffic control support.

The engineering staff perform many tasks many in the studies and traffic impact analysis of new and updated development. Studies include speed, stop sign warrants, traffic signal

warrants, lane capacity and other MUTCD related evaluations. Development review for capacity analysis, evaluation of accidents and mitigation efforts are performed.

A planning group exists that supports long range planning, MPO support, bike locations, and future project development. The administration group supports other for record keeping statistics and human and accounting recourse functions.

The Signal and operations staff report out of the Holly Hill yard while the traffic manager, engineering, planning, administration, signal system supervisor and technical support for signal systems and plan are also located at the County Administration Complex in Deland.

Mosquito and Vegetation Control Characteristics

Mosquito Control Department is comprised of both functions of mosquito and vegetation control. Mosquito Control is responsible for control and reduction of mosquitoes in the County. Vegetation management control is responsible for vegetation management within the drainage systems and right of way within Volusia County. Mosquito Control performs midge control at Lake Monroe and spraying and maintenance of 90 ditch miles and over 400 miles of road rights-of-way as well as the prevention of mosquitoes on the coastline and salt marshes.

There are currently two staging locations for Mosquito Control as depicted in Figure 2-13. The north, east and west section of the County is maintained by the Daytona Mosquito Control Yard. The south and east section of the County is serviced by the New Smyrna Beach Mosquito Control Yard. Inspectors and heavy equipment stage from the Daytona Yard. Inspectors, vegetation control and aerial mosquito control stage at the New Smyrna Beach Yard. Each day, two crews currently stage from the Daytona Yard and drive to Lake Monroe for midge control. One crew inspects for midge population and performs treatments, while the other crew includes a research graduate student.

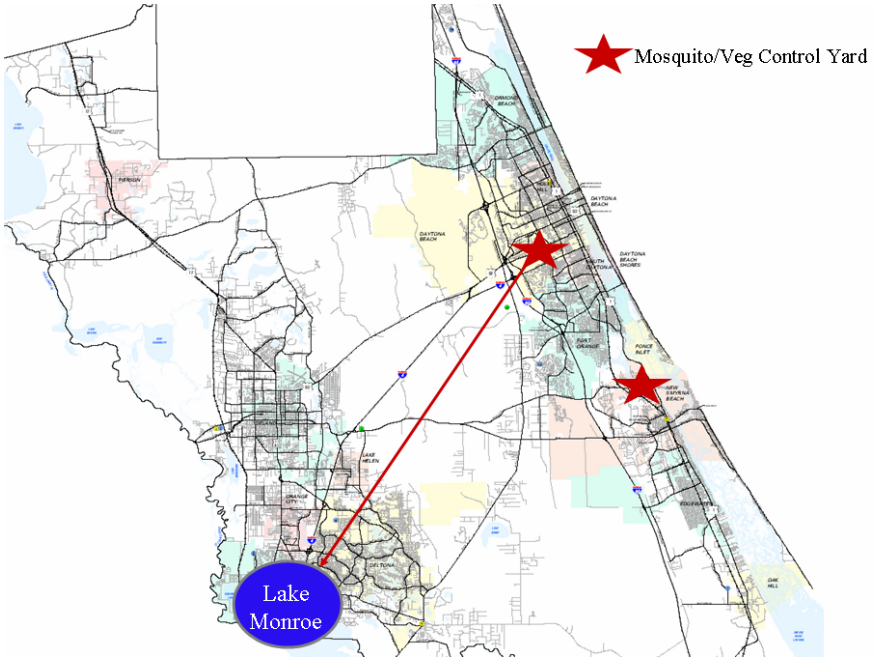

Figure 2-13 - Mosquito Control Staging Areas

Mosquito Control was originally established in Volusia County for a tax district for the east side communities. This tax district is still in place and is a major source of revenue for the Mosquito Control operation. All work performed on County infrastructure on the east side of the County not associated with stormwater is funded by the tax district (Figure 2-14). In addition to the tax district there are several contracts with agencies in the East Side of the County to perform work. Other areas are sprayed on the east side through contracts for the school board, the State and other authorities. The west side is funded through a fund initiated by the County Board of Directors and/or directly with government agency in question. Midge control is funded by a contract with the City of Sanford in Seminole County.

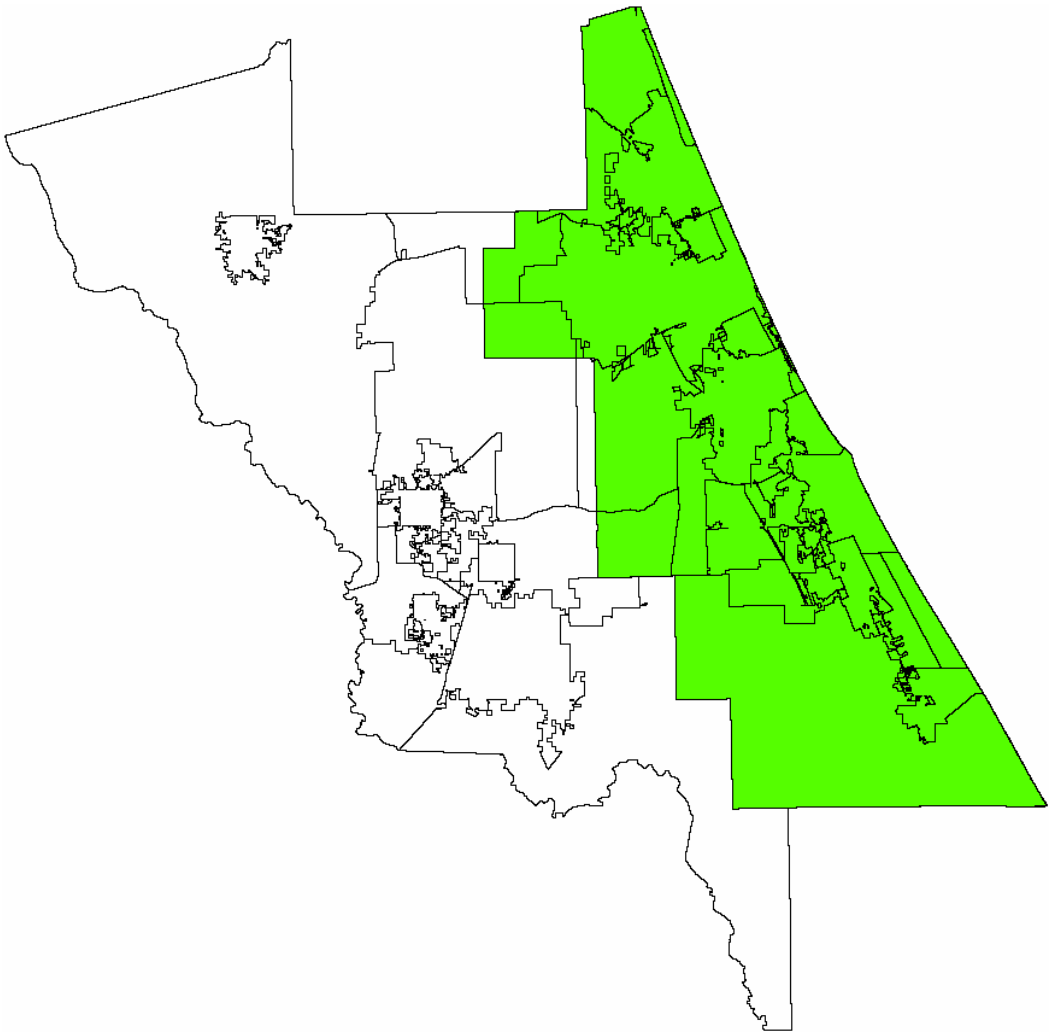

Figure 2-14 - Mosquito Control Tax District

Work is generally assigned in the morning of each day with some work and inspection zones in existence. Inspectors in the north and the south have distinct inspection zones. Fogging zones have been established, but County staff has indicated that zones are out of date. There is currently no "on call" policy in place. A supervisor will be called in when needed and will be paid overtime.

Water Resources and Utilities Characteristics

The Water Resources and Utilities Division (WRU) for the County are responsible for many different assets for water treatment, wastewater treatment, water production, and water distribution and sewer collections.

Assets maintained by WRU, based upon a combination of information in GIS and the FY2005 year end report, includes 265 miles of waterlines, 210 miles of sewer lines, 83.5 miles of reclaimed waterlines, 121 lift stations (107 in active and 15 future lift stations), 15 sewer treatment facilities, 11 water treatment plants, 157 manholes, 1339 fire hydrants (1246 hydrants in GIS), 1982 water valves, 28 serviceable wells, 8 plugged wells and 11

inactive wells. In addition the County is responsible for backflow devices with 1,983 sites that had backflow devices in the Tokay system in July 2006 and in year 2005 report had 1,647 devices.

In addition, WRU is responsible for Utility Engineering and customer billing. Utility Engineering and Billing is staged out of the Engineering office. Staging site for operations varies with the majority of employees reporting to the Deland Yard location and Southwest Regional Plant. Additional employees stage out of the Spruce Creek Site, Southeast Regional Site and Halifax plantation sites. One employee reports to the Spruce Creek plant and then drive to the Deland Yard site using a County vehicle.

Water Operations

According to the FY 2005 report for Utility Operations there are 11 water treatment plants that are maintained and monitored by the WRU division. In addition to these 11 plants there are another 11 other water treatment plants that are overseen for Leisure Services and for the City of DeBary. These plants are located throughout the County. Table 2-1 provides a list of the water treatment plants including their plant ID, type (Community or Non-Community), Class, and Capacity in million of gallons per day (MGD). The 11 plants that are monitored for DeBary or leisure services can be identified by the plant IDs with an "M."

Table 2-1 - Water Treatment Plants

Plant Name	Plant ID	Type	Class	Category	Capacity
Glenn Abbey	WTP 1A	C	C	IV	2,492,000
Breezewood	WTP 1B	C	C	V	576,000
Four Towns	WTP 1C	C	C	V	1,080,000
Highland Country	WTP 1D	C	C	V	1,146,000
Deltona North	WTP 2	C	C	IV	1,000,000
Cassadaga	WTP 5	C	C	IV	180,000
SE Interconnect	WTP 7	C	N/A	N/A	N/A
Halifax Plantation	WTP 8	C	C	II	500,000
Pine Island	WTP 10	C	D	V	108,000
Spruce Creek	WTP 15	C	C	II	1,000,000
Stone Island	WTP 17	C	N/A	N/A	N/A
Enterprise	WTP 18	C	N/A	N/A	N/A
Meadowlea	WTP 19	C	D	IV	86,000
Hope of Seville	WTP 20	C	D	V	120,000
Chuck Lennon	MWTP 1	N	D	V	33,600
Hester park	MWTP 4	P	D	V	50,000
Highbridge Park	MWTP 5	L			
Lake Ashby	MWTP 9	N	D	V	
Lake Dias	MWTP 10	L			
Mary Dewees	MWTP 12	N	D	V	
Nancy Cummings	MWTP 13	L			
Osteen R&B	MWTP 14	L			
Strickland Shooting	MWTP 15	N	D	V	
Bill Keller	MWTP 18	N	D	V	
Orange City Interconnect	MWTP 19	C	N/A	N/A	N/A

Water production is shown in Figure 2-15 in the millions of gallons (MG) produced by year from FY 1996 through FY 2006. From 1995 through FY 2006 water production increased from 732 MG to 1,276 MG. This is a 74% increase or 6.7% annually. 6.7% is well above the actual population growth. The growth has slowed in the past 6 years. Since FY 2000 when 1,224 MG were produced water production has slowed to 4% over 6 year or less than a 1% average increase per year. In FY2001 and FY 2002 production actually went down. Rainfall may also be a contributing factor to production.

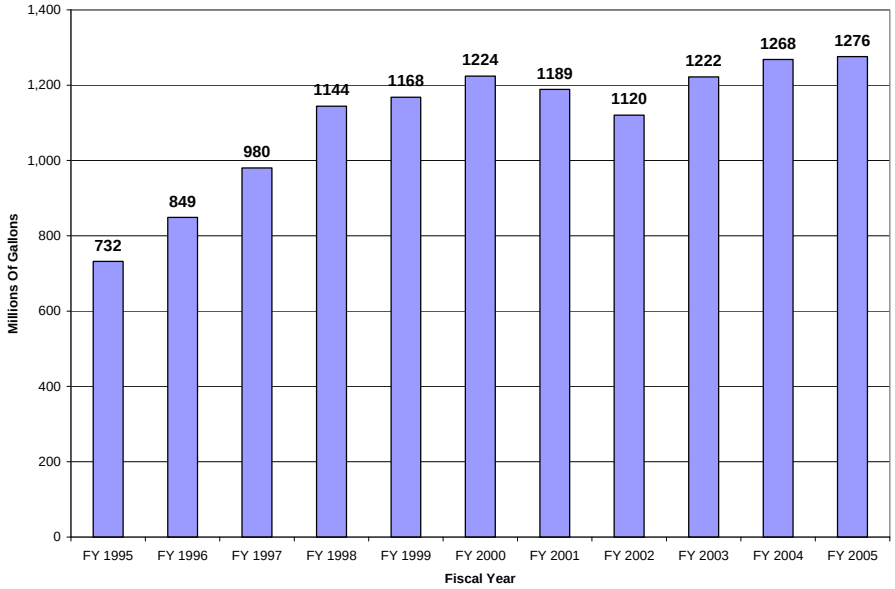

Figure 2-15 - Water Production from FY1995-FY2006

Water loss data can be a tool for evaluating effectiveness and efficiency of water operations was reviewed. The County appears to be experiencing negative water loss in some areas. A negative water loss indicates that more water is reported as being produced or purchased than what was used through meters, flushing or line breaks. Figure 2-16 demonstrates the water loss by area. Two areas: the Spruce Creek Water treatment plant and the southwest interconnect experienced negative water loss. Meadowlea, Casadaga and Pine island areas are all experiencing water loss above 20%. While water loss varies by area the overall percentage of water loss is decreasing. From FY 2001 through FY 2005 water loss percentage decreased from 9.8% to 2.5%. This is demonstrated in Figure 2-17.

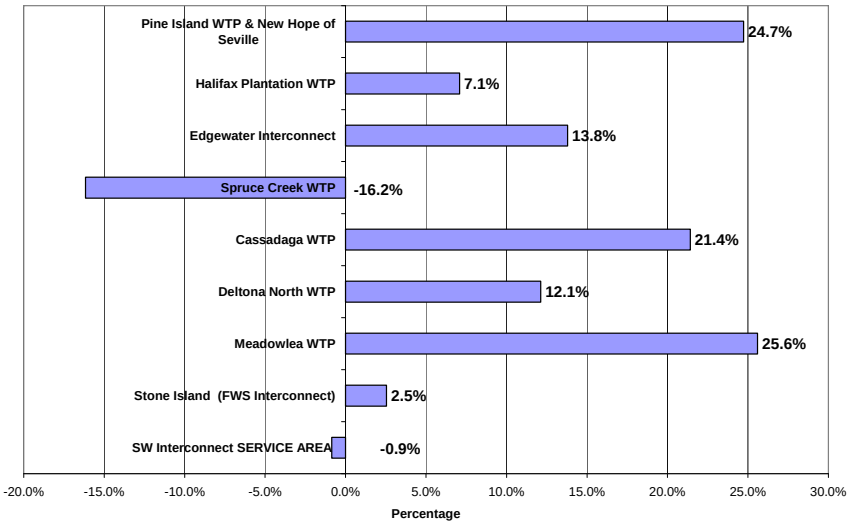

Figure 2-16 - Water Loss by Area for FY 2005

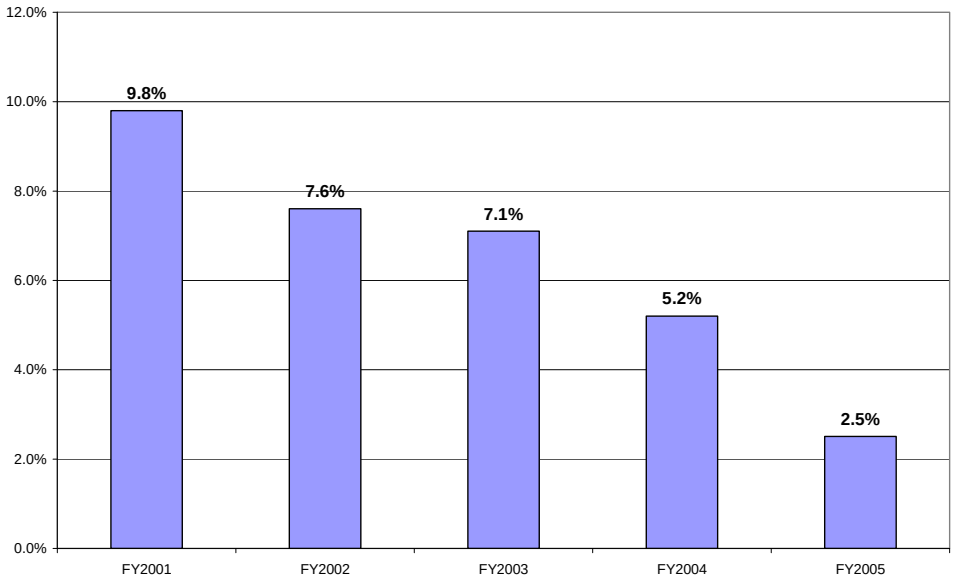

Figure 2-17 - Water Loss Percentage by Year

Water operators are responsible for testing the drinking water quality with 3,837 drinking water samples were taken. In addition 5,587 wastewater samples were also taken. This includes samples tested in-house or sent to external labs for testing. A variety of tests are performed and include, but are not limited to, coli form, turbidity, PH, lead & copper, TDS, calcium, sulfate, ammonia and nitrogen. Testing can have is time consuming and has a significant impact on staff workload. As samples are taken WUO staff must follow proper procedures and document the chain of custody for each sample. In the event a sample comes back positive additional samples must be taken and residents notified with a boil water notice. In some case telephonic notification to customers exists but in many cases staff must hand deliver boil water notices to residents. Once water quality issues have been rectified, staff must hang door notices notifying residents that it is safe to drink water.

Fire Hydrants

According to the FY2005 report the County maintains 1,339 fire hydrants. The Volusia interconnect area has the most fire hydrants to maintain. Fire hydrants are currently maintained on a contract basis. The following outlines the fire hydrants by area:

- Volusia Interconnect – 548
- Orange City – 144
- Deltona North – 138
- Spruce Creek – 151
- Halifax Plantation – 241
- South East Interconnect – 112
- Hope Villas of Seville – 5

Backflow Devices
According to data collected in July 2006 the County is responsible for 1,983 sites. The FY 2005 report indicates the County is responsible for 1,647 sites. In the FY2005 979 or 59% of the devices are commercial and 668 or 41% of the devices are residential or for reclaimed water.

Backflow information is maintained within the Tokay system. Tokay is specifically designed for maintaining and monitoring backflow information. If a device need to be inspected, a letter will be sent out to the appropriate customer. After three notification letters are sent out without test results being returned, the County will perform the test and bill the customer directly.

Wastewater Treatment Operations

Wastewater treatment operations are responsible for 15 sewer treatment facilities, 121 lift stations. In addition there are 50 monitoring wells and 121 lift stations. Sewage treatment capacity ranges for the plants range from 7,000 gallons to 1.2 million gallons. 10 of the 15 facilities are smaller "package plants" which have a capacity ranging from 7000 to 50,000 gallons.

Table 2-2 outlines the sewage treatment facilities and capacity. In general the package plants service 22 to 69 service connections with the exception of Meadowlea with 257 service connections. Figure 2-18 shows the number of services connection per package plant. Package plants are located throughout the County. The larger or regional non-package plants have a greater number of service connections ranging from 644 to 4,821.

Table 2-2 - Sewer Treatment Facilities

Plant Name	Plant ID	Type	Class	Category	Capacity
SW Regional Reclamation	STP 1	Orbal	C	III	1,200,000
Deltona North Reclamation	STP 2	Orbal	C	III	499,000
Four Towns	STP 3	Oxidation Ditch	C	III	300,000
SE Regional Reclamation	STP 7	Orbal	C	III	600,000
Halifax Plantation	STP 8	Anaerobic / Anoxic	D	III	300,000
Pelican Dunes	STP 9	Package	D	III	50,000
Pine Island	STP 10	Package	D	III	15,000
Leeward Winds	STP 11	Package	D	III	12,000
Spanish Waters	STP 12	Package	D	III	9,000
Ocean Dunes	STP 13	Package	D	III	7,000
Sunny Beach Condo	STP 14	Package	D	III	11,000
Atlantic 22	STP 15	Package	D	III	7,000
Tiffany Condo	STP 16	Package	D	III	9,000
Meadowlea on the River	STP 19	Package	D	III	43,000
New Hope Villas	STP 20	Package	D	III	24,400

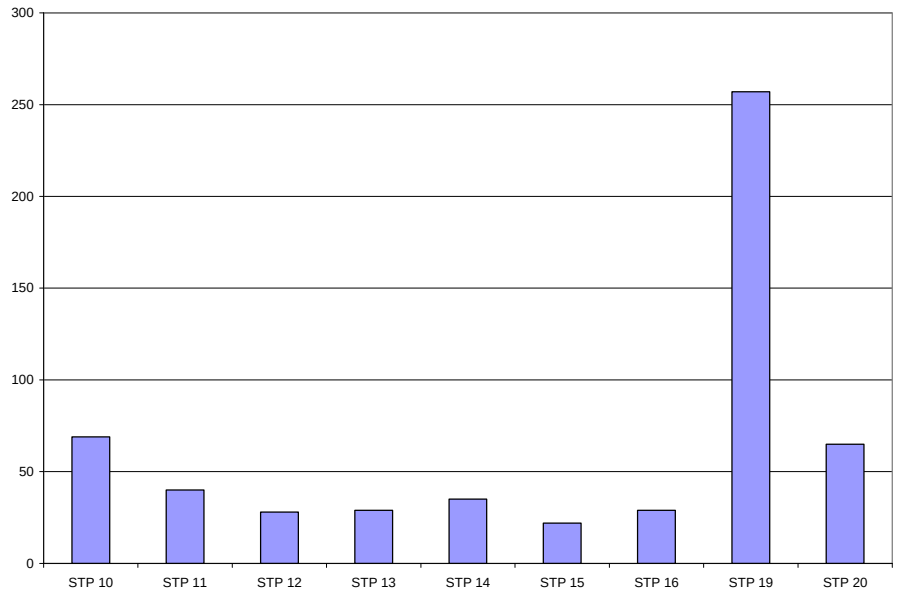

Figure 2-18 - Service Connections per Package Plant

LAC reviewed wastewater treated in FY 2005. Million of gallons treated between October 2005 and September 2005 ranged from 45.9 million gallons to 61.7 million gallons. Figure 2-19 shows by month the MG gallons treated. As demonstrated in the graph wastewater treatment decreases in the winter months and increases during the summer.

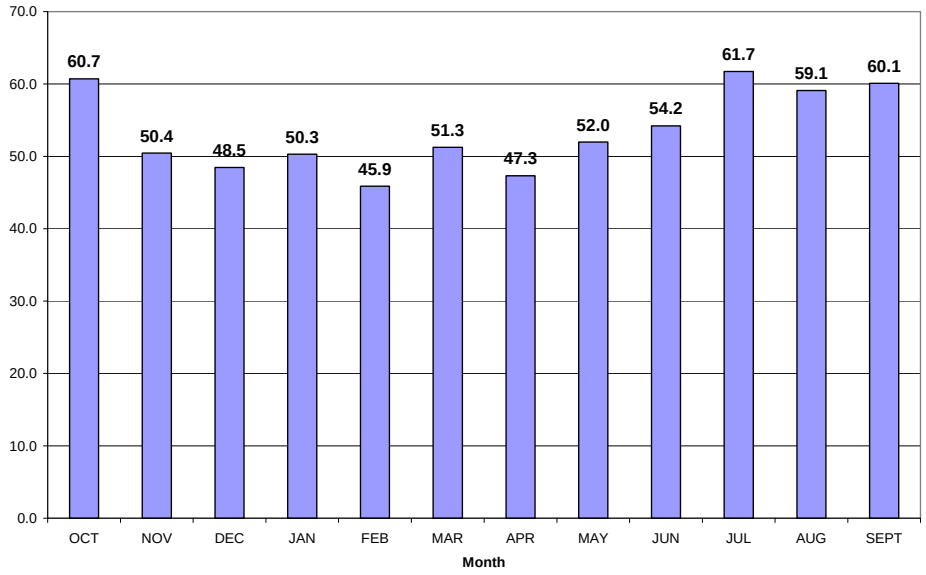

Figure 2-19 - Millions of Gallons Treated

Figure 2-20 demonstrates that average Million Gallon per day (MGD) of wastewater treated by Fiscal year. The average MGD treated from FY2001 increased from 1.27 MGD to 1.76 MGD which is an increase of 38%.

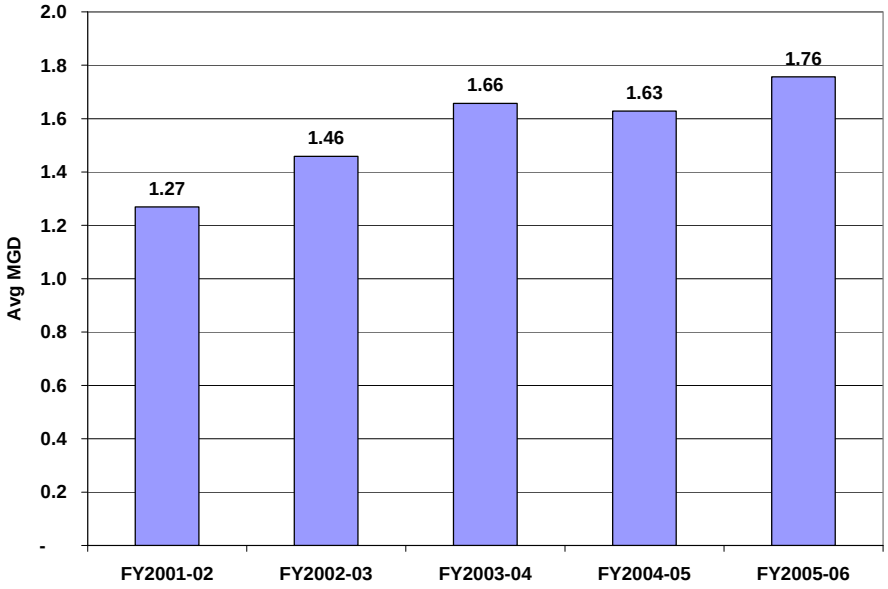

Figure 2-20 - Average MGD of Wastewater Treated by Year

Volusia County also provides reuse water which is treated wastewater. 883 or 99% of the reclaimed accounts are in the Southwest Service Area. Most of the water is used for residential use and percolation ponds. In addition the Southeast regional plant provides reuse water to a County orange grove that borders the plant, golf courses and other commercial users. There is an additional 4 meters located in the Deltona North Area. Figure 2-21 shows the millions of gallons from October 2004 through September 2005 which varied from 26.3 MG to 36.2 MG.

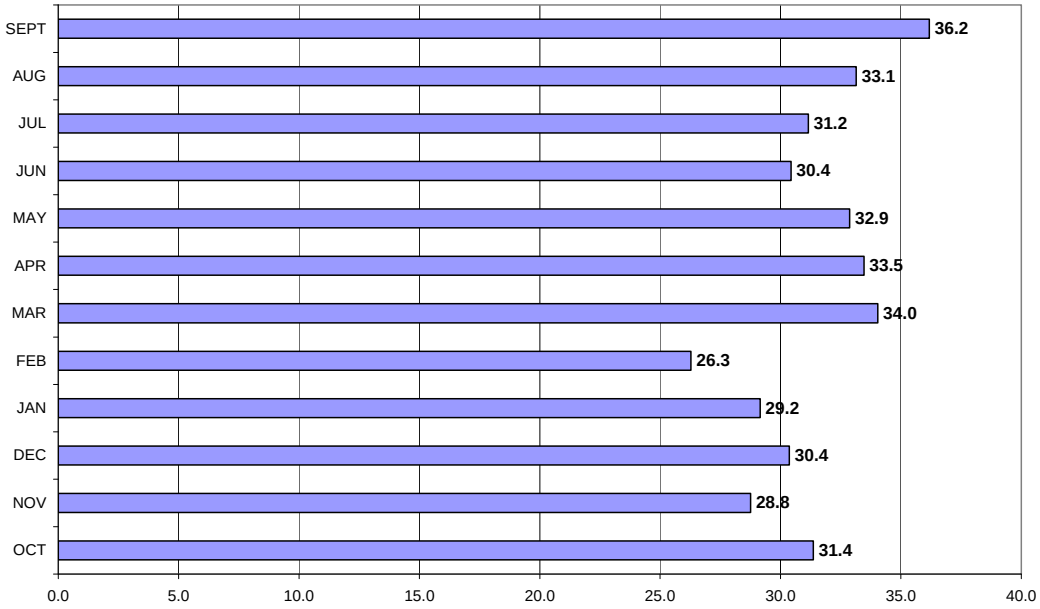

Figure 2-21 - Millions of Gallons of Reuse

The number of accounts, though small, that use reclaimed water has increased dramatically since FY 2001 with considerable growth in the last year. From 2004 to 2005 Reuse accounts increased from 614 in FY 2004 to 887 in FY2005 which equates to a 45% increase in one fiscal year. In 2006 at the time of this report there were 1,169 reuse accounts. Figure 2-22 demonstrates the increase in reuse accounts from FY 2001 to FY 2005.

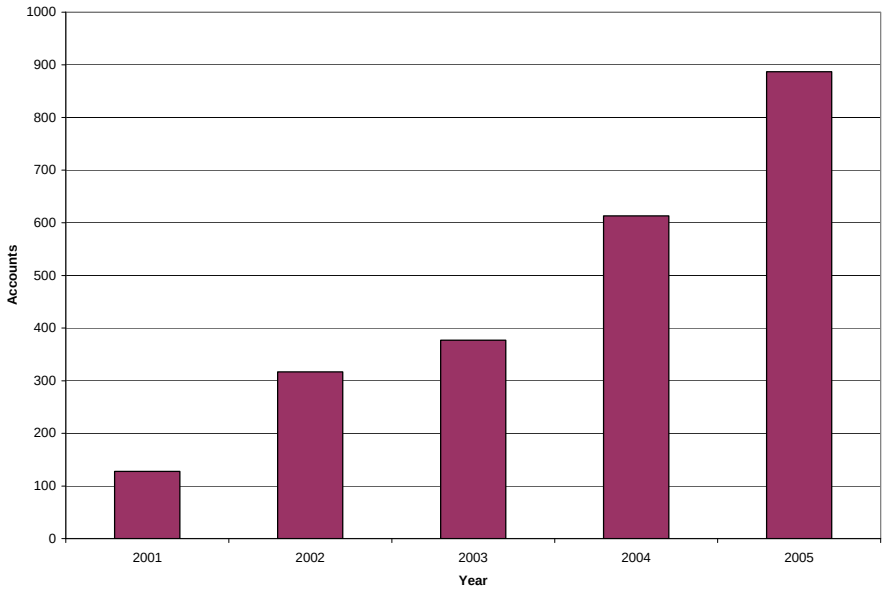

Figure 2-22 - Reuse Accounts from FY 2001 through FY 2005

Water Distribution/Sewer Collection

The County utilizes one crew to perform both water distribution and sewer collections. This crew is responsible for performing locates and repairs on the County's 265 miles of

waterlines and 210 miles of sewers. In addition this crew installs new water meters, replaces water meters and performs meter sets. In FY 2005 5,393 locates, 707 new water meters, 230 water meters replaced and 270 reclaimed meter sets.

SCADA

The County utilizes Supervisory Control and Data Acquisition systems (SCADA) to monitor lift stations, water treatment plants and sewer treatment plants. SCADA system allows remote monitoring and some control of specific points at a location without being on-site. WRU utilizes two separate SCADA systems, Wonderware and Dataflow. Wonderware is a satellite monitoring system and has limited use at remote sites. SCADA is currently being utilized at 113 different sites across the County. 97 of the 121 lift stations currently have some SCADA utilization. Figure 2-23 demonstrates the number of sites that have SCADA by location type. The County provided a table that indicated the number of points that are monitored by location type (Table 2-3). There are a total of 3,630 points being monitored through the 113 sites that have SCADA throughout the County.

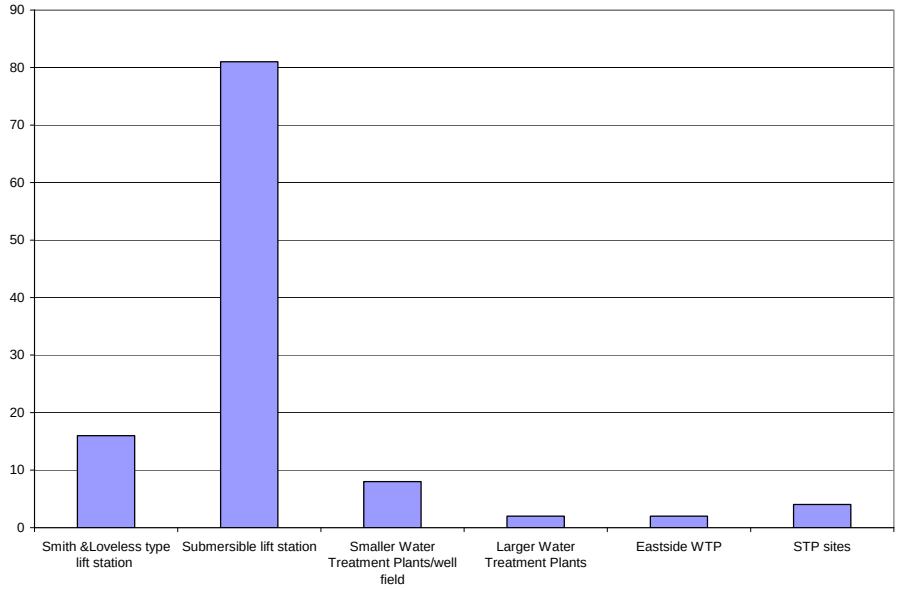

Figure 2-23 - SCADA Sites by Location Type

Table 2-3 -SCADA Site and Points by Location Type

	Number SCADA sites	Points per site	Total points
Smith &Loveless type lift station	16	12	192
Submersible lift station	81	38	3,078
Smaller Water Treatment Plants/well field	8	12	96
Larger Water Treatment Plants	2	40	80
Eastside WTP	2	56	112
STP sites	4	18	72
	113		3,630

Utility Billing

Utility Billing is located in the Engineering Office in DeLand. Utility Billing is responsible for reading water, wastewater and irrigation meters and billing customers. As of August 2006 based upon information provided by the Utility Billing had 14,609 water customers, 10,564 sewer customers, 1,159 reclaimed water customers. Figure 2-24 demonstrates the number of accounts by type.

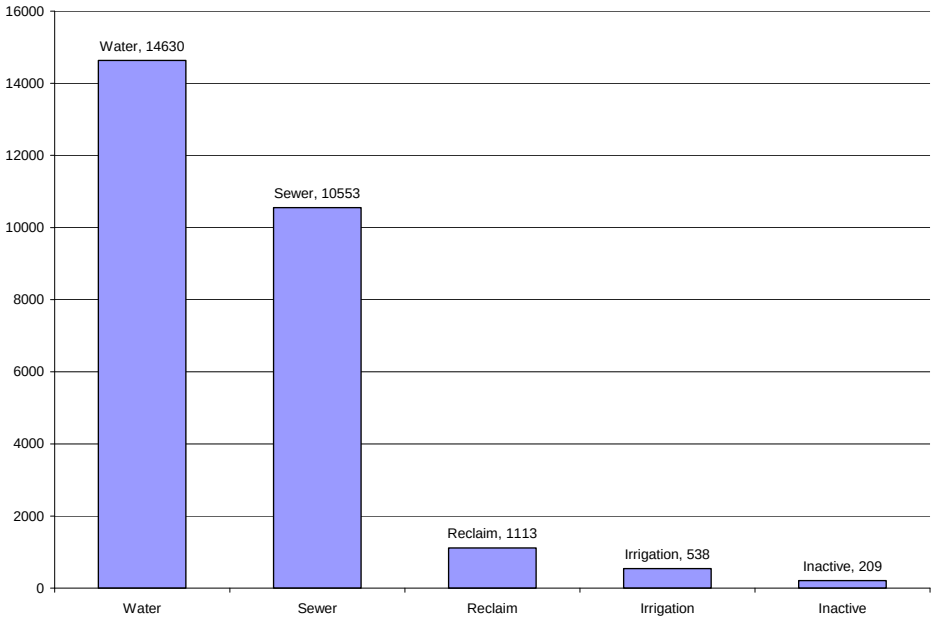

Figure 2-24 - Customer Accounts by Type

The County as of July 2006 has contracted out meter reading at a rate of $0.68 per meter. In addition, Utility Billing has a maintenance worker that will perform re-reads and minor repairs and maintenance to the meters as needed. In a review of actual billings from September 1993 through September 2005 is demonstrated in Figure 2-25. In June of 2006 there was a total of 14,370 billing in a report from the BillMaster system there was actually 15,447 meters and of those 209 meters were inactive for a total of 15,238 meters. This is a difference of 868 meter that was billed versus actual meters. The Utility Billing Division also indicated there may be an error in the actual number of meters and the actual County may be as high as 17,818 meters or a difference of 2,371 in actual meters documented. If this is determined to be true, the County will experience a dramatic increase in the number of meters next year. Meter data and Account data between utility operation and utility billing does not match.

Figure 2-25 through 2-28 demonstrate the number of accounts by area for each meter type. The Southwest Service area has the greatest number of accounts for all meters types and serves the greatest number of County residents. In addition there are 1,159 reclaimed meters in the southwest area according to Utility Billing.

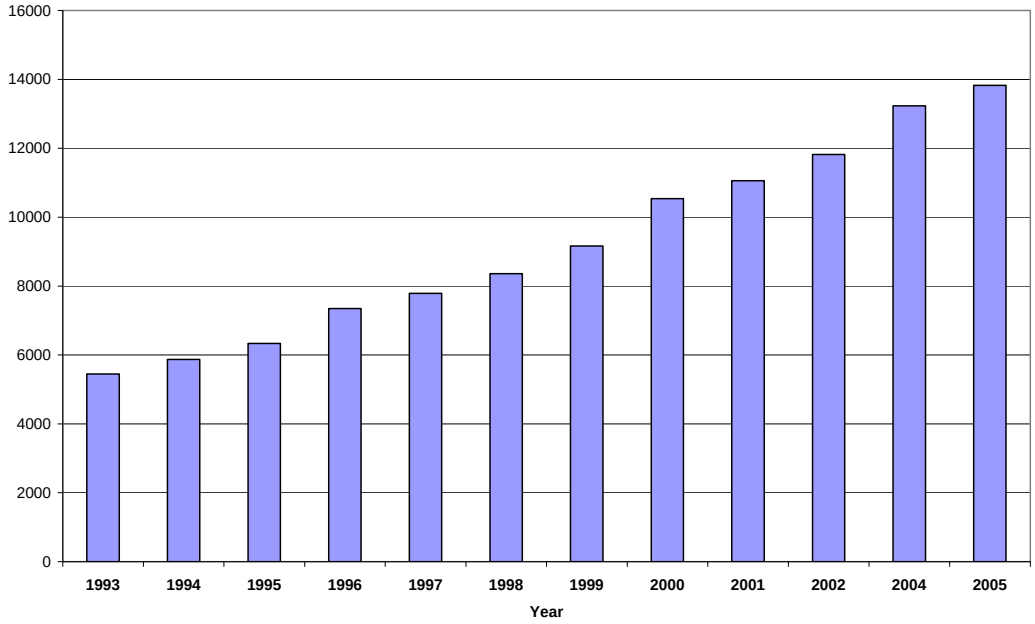

Figure 2-25 - September Billings by Year

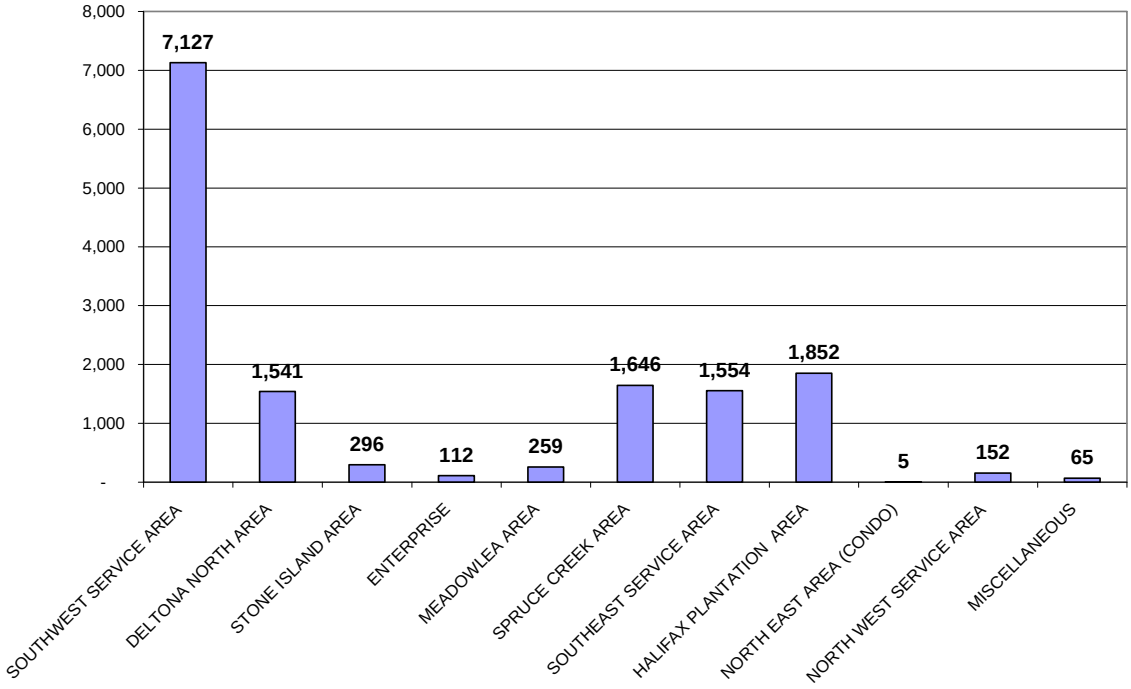

Figure 2-26 - Water Accounts by Area

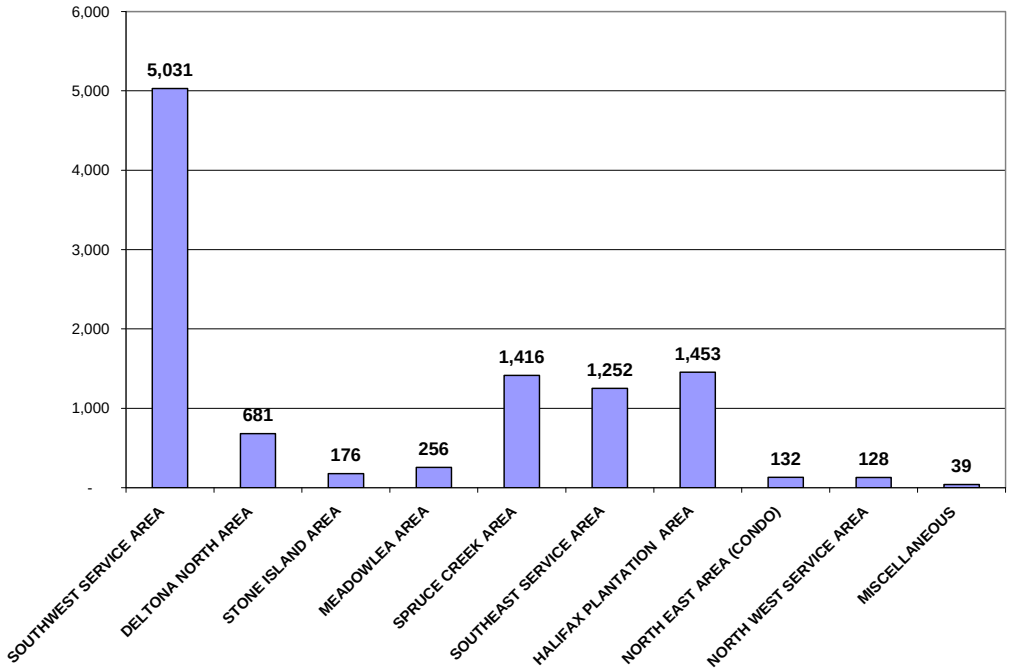

Figure 2-27 - Sewer Accounts by Area

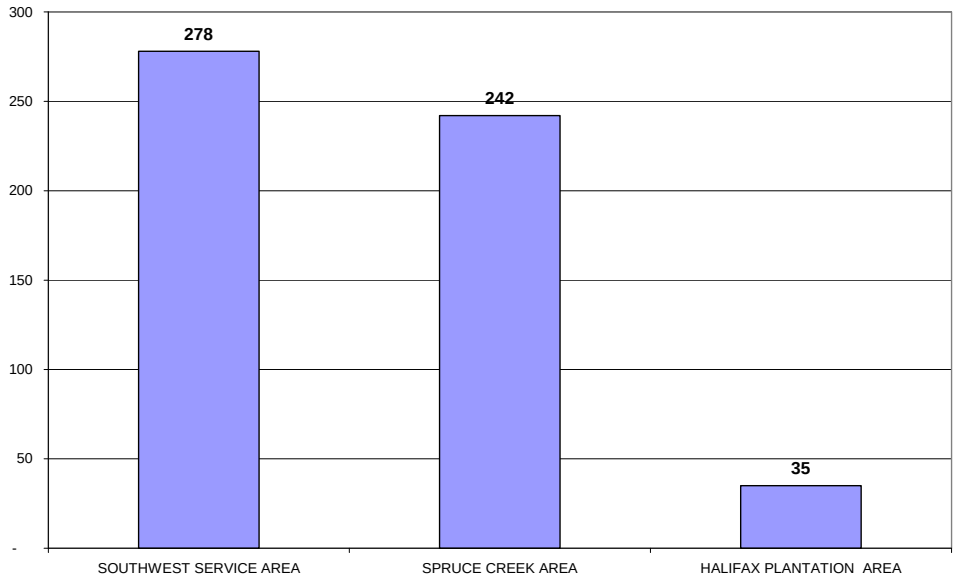

Figure 2-28 - Irrigation Meters by Area

Utility Rates

Utility rates vary by type and volume used. Utility Billing has rates for both unsoftened and softened water. Softened rates are for the effort to treat brackish water by membrane softening in eastern Volusia. Rates vary by amount of use and type. The Rates for both types of water and sewer rates are outlined below:

Unsoftened rates

- Water
  - 0-7K gallons - $1.60 per 1K gal
  - 7K-14k gallons - $1.83 per 1K gal
  - 14K-21K gallons - $2.32 per 1K gal
  - Above 21K gallons - $4.81 for each 1K gal
- Irrigation
  - 0-7K gallons - $2.32 per 1K gal
  - Above 7k gallons - $4.81 per 1k gal
- Reclaimed Water
  - 0-7K gallons - $.88 per 1K gal
  - 7L-14K gallons - $1.09 per 1k gal
  - Above 14k - $2.31 per 1k gal
  - Charge $.10 per 1k gal at disposal sites.

Softened Rates

- Water
  - 0-7K gallons - $3.03 per 1K gal
  - 7K-14k gallons - $3.55 per 1K gal
  - 14K-21K gallons - $3.76 per 1K gal
  - Above 21K gallons - $6.26 for each 1K gal
- Irrigation
  - 0-7K gallons - $3.76 per 1K gal
  - Above 7k gallons - $6.26 per 1k gal

- Sewer Rates
  - $3.13 for each 1K of usage, capped at 14,000K

Solid Waste Characteristics

The Solid Waste Division is responsible for operations at the Tomoka Landfill, the West Volusia transfer station, unincorporated residents trash collection and recycling for ~43,000 customers through Solid Waste Management Contract, maintaining recycling contract with Gel Corporation, woody waste recycling, methane recovery plant, enforcement issues, the adopt a road program, hazardous material recycling and educational programs. Solid Waste employees stage out of two separate locations the Tomoka Landfill or the Transfer Station.

Landfills

The County currently is responsible for two landfills: the Tomoka Landfill (Landfill) and the Plymouth Landfill. The Plymouth landfill is closed and is approximately 129 acres with expected long term care until 2029. Plymouth site though not operational requires systematic mowing by contract and general monitoring by Solid Waste staff.

The Tomoka Landfill is open 364 days per year closing only on Christmas Day. Hours of operation for the operational Tomoka Landfill are Monday through Friday 7am to 5:30pm and Saturday through Sunday 8am to 3pm. The closing time is the time the last

vehicle is allowed to enter the landfill. It may be as late as 6:30pm on weeknights before the last vehicle leaves the landfill. To provide coverage for the hours of operations in general Solid Waste employees work a 4/10 hr day week. However there are some employees that work a 3@11 hour day per week with an additional day at 7 hours. This is to provide coverage for long operational days on the weekend.

The Tomoka Landfill is the main site for refuse disposal within the County and is on 3,400 acres. Only a small portion of the area is now in direct use with capability for landfill operations for well over 50 years. There are currently as classified by Florida Statues, a Class I (household waste) and Class III (construction waste) disposal cells onsite along with a 40,000 square foot recycling center managed by Gel Corp. The Tomoka Landfill area is divided into several different cells for waste disposal: The North Cell, East Cell, South Cell and C-III cell.

The north cell is a 38.2 acre Class I disposal site which began accepting waste in June of 1999 and is currently in operation. The estimated closing for the North Cell is eight years from the initial receipt of waste. The County is currently in the process of constructing Phase 1 of the Class I East Cell, which is expected to begin accepting waste in January 2007. Phase 1 of the East Cell is 28.5 acres and is expected to add 4.4 million cubic yards (CY) of disposal capacity to the landfill and has a design life of 6 years from the date it begins accepting waste. Phase I and II of the East Cell is projected to add a combined 7 million CY of disposal capacity. The East Cell is being constructed next to the North Cell. The capacity of the North Cell and Phase 1 of the east cell in 2005 is 4,422,418. Capacity is expected to be depleted in FY 2013 for the North Cell and Phase1 of the East Cell.

The South Cell is a 114 acres Class I and Class III disposal site. The South Cell is currently closed with an expected 26 years of long term care remaining. There is also an 81.6 acre C-III cell on-site which is currently in operation and used for construction waste. The expected closure of the C-III cell is projected to be in October of 2016. The remaining capacity of the C-III as of 2005 was 2,936,884 CY. The capacity of the C-III is expected to be depleted in February of 2017.

Each night prior to closing the landfill as required by Florida State Statues the County covers the waste that was land filled. This process is finalized after the last vehicle has departed the landfill. Solid Waste employee will stockpile dirt and other alternative cover beginning at approximately 3pm to ensure that there is enough evening cover. The County has planned to use other alternative cover in the future by utilizing a cover tarp in next cell. Also, a combination of treated sludge (N-Viro) with additives is used as cover which material is produced onsite by contractor using County sludge.

Solid Waste reported the amount and type of cover used by the County (Figure 2-29). In January through March of 2006 the majority of cover used was dirt. April through September of 2006 indicated alternate cover types such as mulch were being used in similar proportions to the Dirt Cover. Figure 2-30 shows the coverage type by percentage

from January 2006 through September 2006. 59% of the cover material used (173,625 CY) was dirt and 31 % (93,043 CY) of the cover type used was alternative cover.

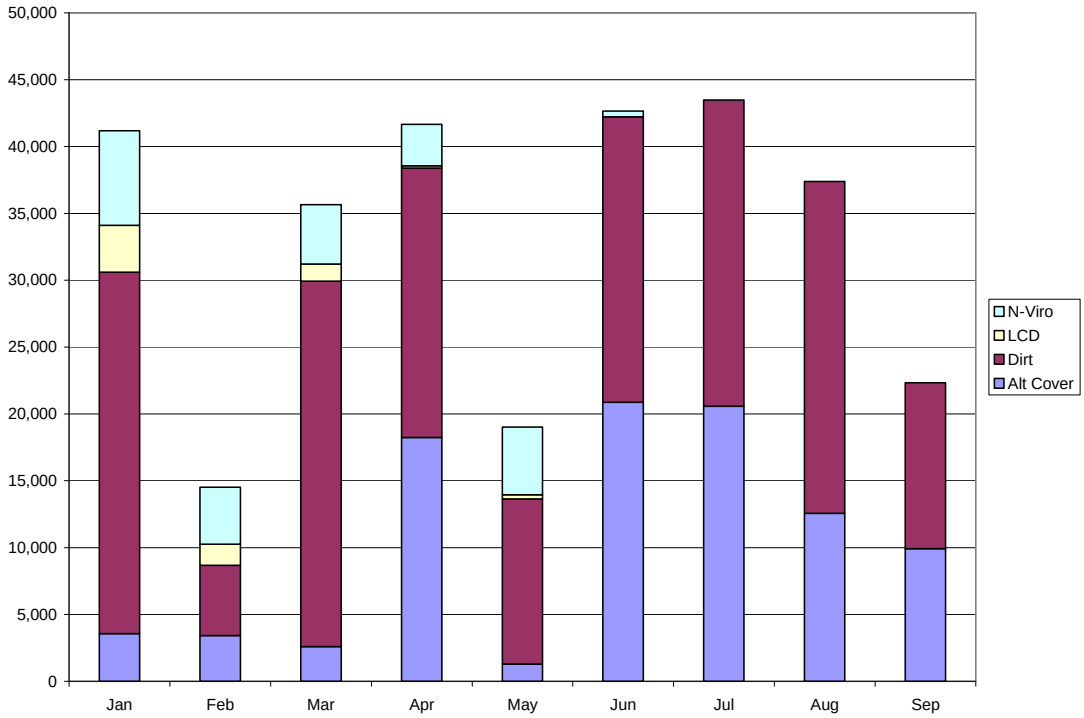

Figure 2-29 - Land Fill Cover (CY)

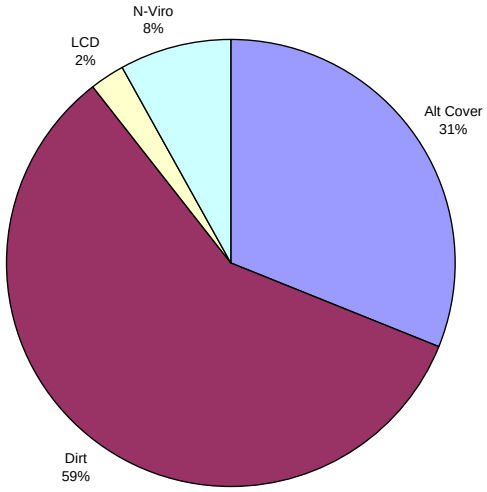

Figure 2-30 - Percentage of Coverage Material by Type (1/06-9/06)

Transfer Station

The transfer station is located at the intersection of Highway 4 and 44 on the West Side of Volusia County. Commercial and Residential vehicle can bring refuse, recycling and woody waste to the site for disposal. Waste is then transferred from the Transfer station to the Tomoka Landfill. Figure 2-31 demonstrates two routes the haul truck may use to deliver waste to the Landfill. The general haul truck route travels via highway 4 to the Landfill which is approximately a 17 mile miles and consumes about 25 minutes for one direction. These services are believed to provide customer service to the SW portion of the County.

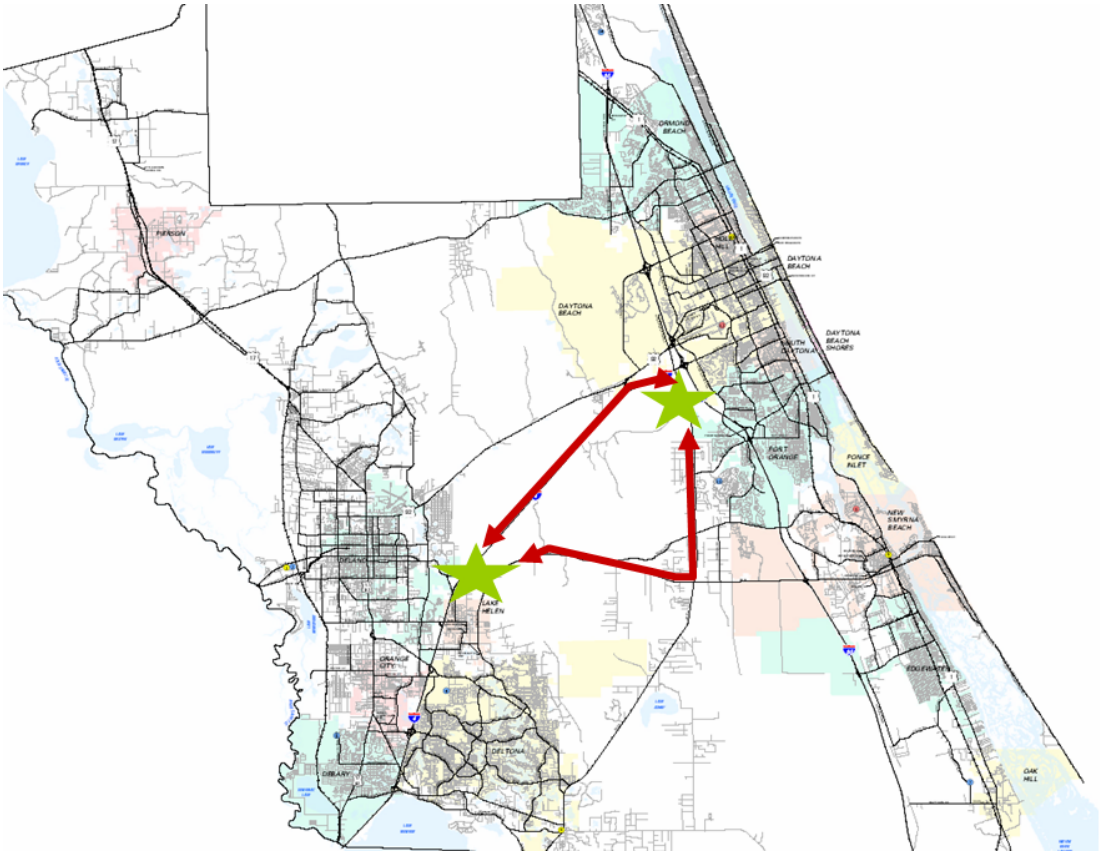

Figure 2-31 - Transfer Station Haul Routes

9,907 loads were hauled from the Transfer Stations to the Landfill in 2005. This is a 21% increase in the number of loads hauled in 2004. From 2002 to 2004 the number of load hauled remained relatively constant with a 2% increase overall. Figure 2-32 provides a breakdown of loads hauled by year. Figure 2-33 demonstrates in how many thousands of CYs were hauled from the Transfer station to the Landfill. 175,000 Tons were hauled in 2005 and 185,283 tons were hauled in 2006.

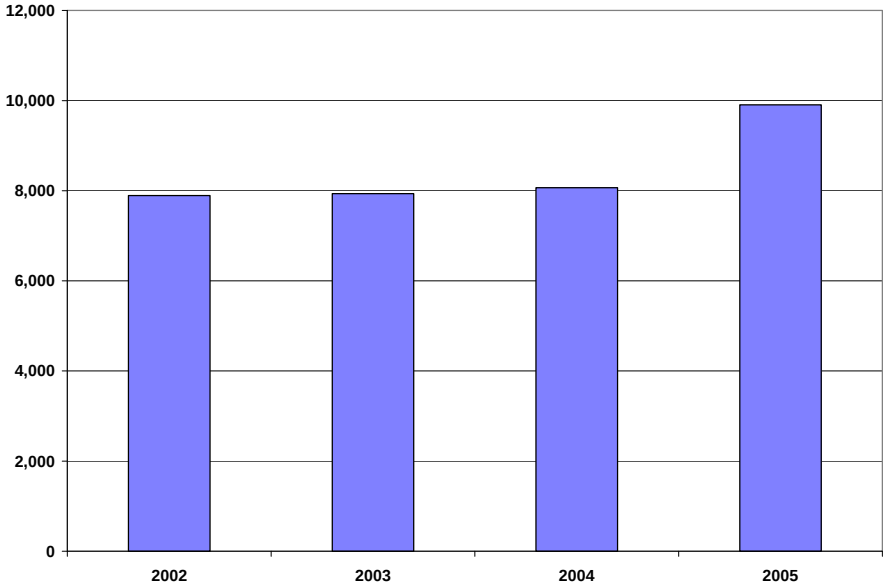

Figure 2-32 - Loads Hauled

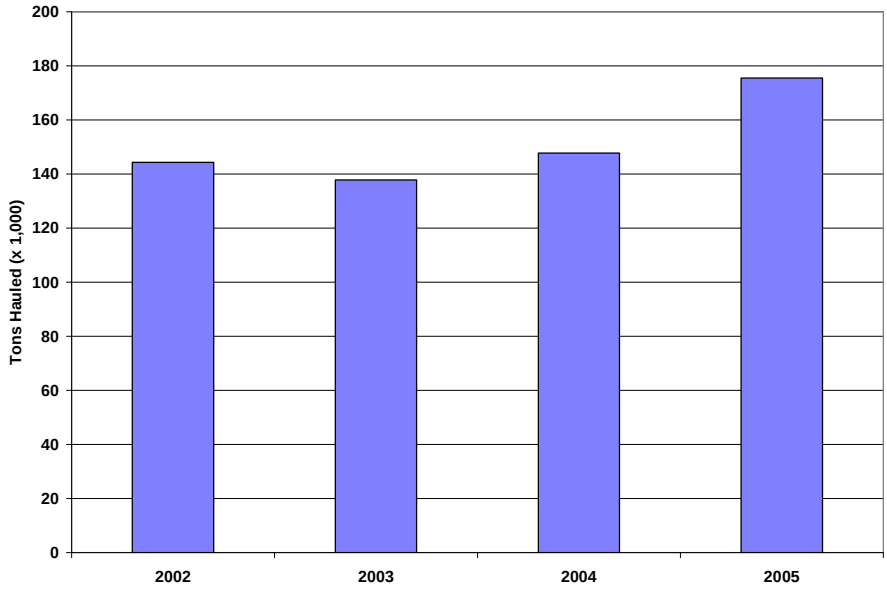

Figure 2-33 - Cubic Yards (1,000) Hauled

Fees

The County currently charges a fee for residential waste collection for garbage, recycling and yard waste and tipping fees at the transfer station and Landfill for waste disposal. The fees are as follows:

- Waste Collection Fee - $132.00
- Tipping Fees
    - Flat Rates
        - Cars - $4.00

    - Pickup, Vans and Trailers - $8.00
- Waste Rates for Vehicle Over 2.5 CY Capacity
    - Class I Garbage - $34.00 per ton
    - Class III Garbage - $28.00 per ton
    - Yard Trash and Land clearing - $ 23.00 per ton
    - Clean Debris - $13.00 per ton
    - Tires - $100.00 per ton(vehicles) and $160.00 per ton (Oversized)
    - Asbestos - $200.00 per ton

Rate Study

A rate study was performed for Solid Waste by Burton and Associates Utility Economics in June of 2006. Results of the study indicate that no additional tipping fee increases would be required until 2015 and no annual increase in the rate of collections anticipated through 2013. Further, the report indicated that a Sunday closure of landfill may be warranted and appears to be financially feasible.

General Solid Waste Information

Solid Waste historical data is summarized providing statistics below in Figure 2-34 for the refuse tonnage by location. The majority of the refuses tonnage was delivered to the Tomoka Landfill (73%). In 2005 which is the last year LAC has complete data for the Tomoka Landfill had 400,490 tons of refuse and the transfer station had 155,243 tons of refuse which is 27% of the total refuse.

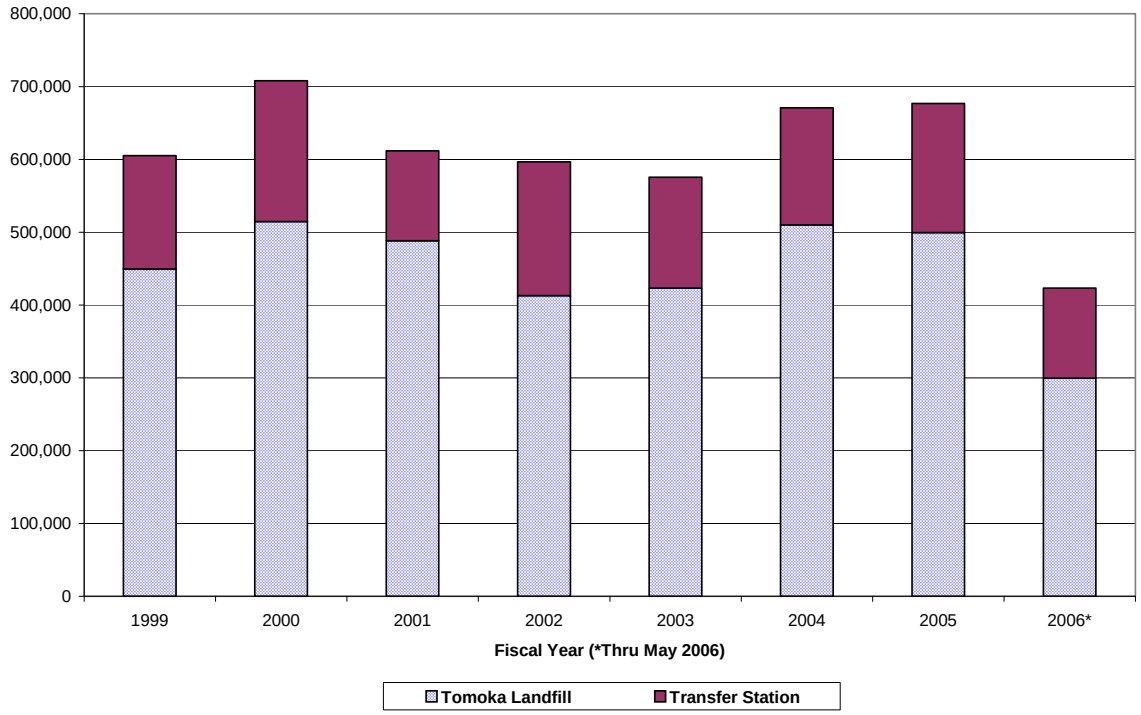

Figure 2-34 - Refuse Tonnage by Location

Solid Waste is responsible for woody waste and tracks historical grinding tonnage. Grinding tonnage remained relatively low and was performed at the transfer station until

2004 and 2005. This is as a result of the 2004 and 2005 hurricanes (Figure 2-35). Woody waste has decreased in the first half of 2006.

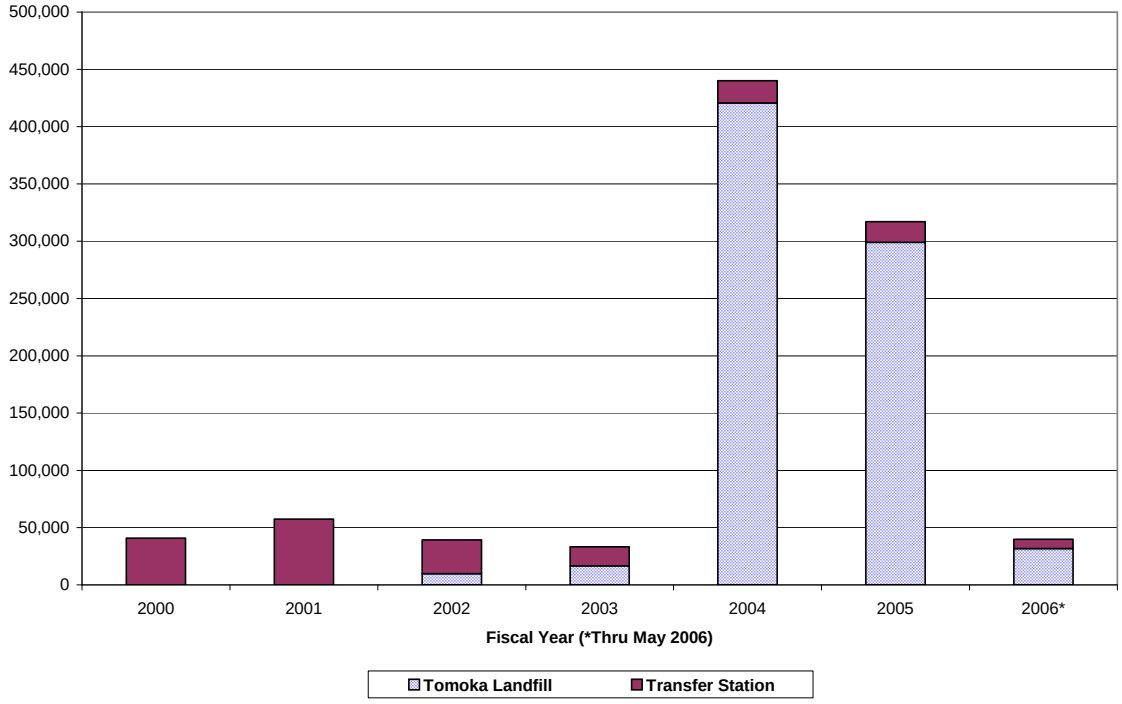

Figure 2-35 - Grinding Tonnage by Location

Solid Waste tracked the number of vehicle that are processed at the landfill and transfer stations. In 2005 which is the last year of complete data Solid Waste processed 187,751 vehicles. 33% of these vehicles were processed at the Transfer station. Figure 2-36 demonstrates the vehicles processed by location from 1996 through September 2006.

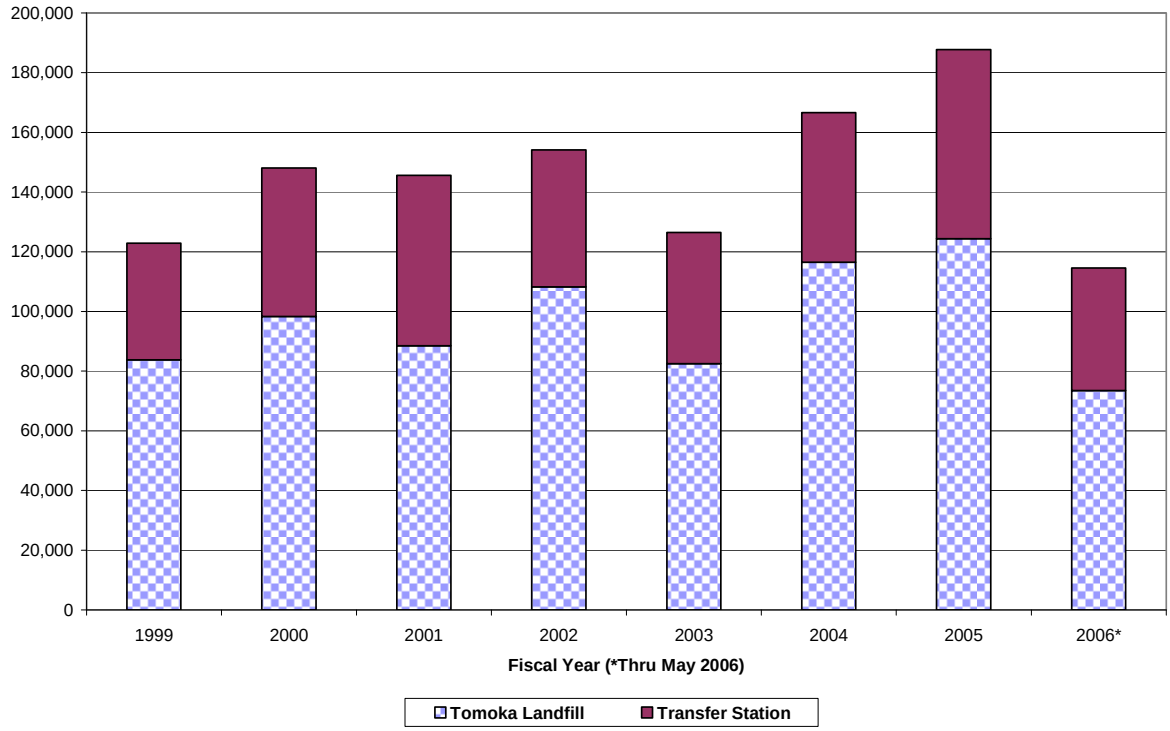

Figure 2-36 - Vehicles Processed by Location

The largest number of customers live in Daytona Beach (47,783). Unincorporated Volusia County and the City of Deltona are the next largest customers. The unincorporated portion of the County makes up only 19% of Solid Waste customers. Figure 2-37 demonstrates the customer by area.

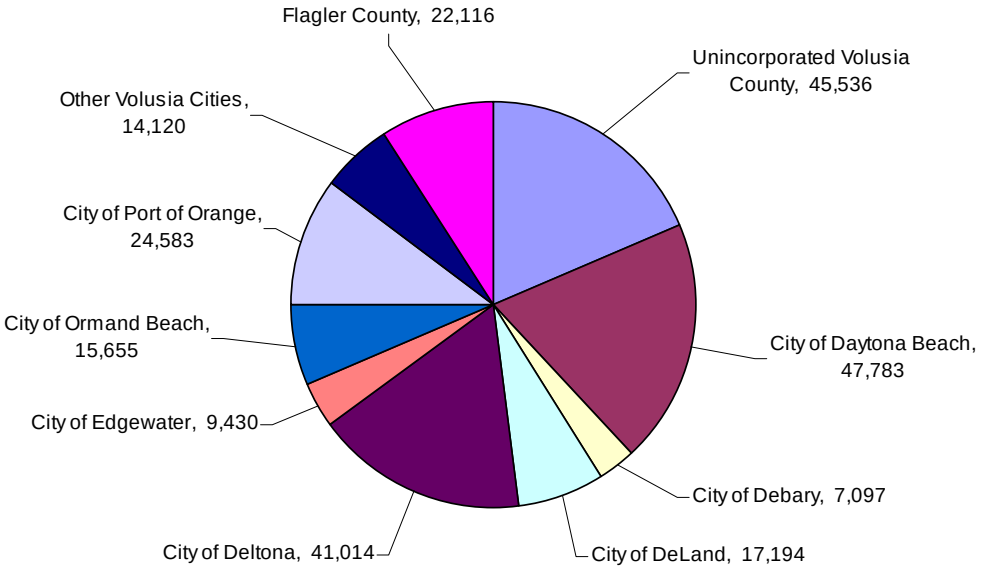

Figure 2-37 - Customers by Area

The County Solid Waste has an annual report performed on financial responsibilities of all land filled areas by a consultant. Among the items identified in the current October 2006 report were the estimated life of the landfill based on the area and potential air space volume of landfill available and volume of airspace used historically for both Class I and Class III landfill areas. Other information includes projected cost to operate as well as for final future closure the landfills. Further, projections are made of future usage and life of each cell. Currently Class III area projects to a life of 2017 and Class 1 area life to 2013 until other areas are opened for landfill operations. The volume used in 2005 was reported at 401,869 for Class 1 and 131,136 for Class III. Class I is projected in 2006 at 507,735 and 228,321 for Class 3. Also, the amount of fill used for cover in 2006 is estimated by County at 402,121 CY.

Construction Engineering Characteristics

County construction engineering group which is located at the County Court House annex is responsible for many roadway functions with Public Works. This includes project management and design, survey, rights of way acquisition and planning, construction management, roadway condition assessment and administration. The main function of this group is to implement the five year capital improvement program.

This effort results in expenditures of $35-45 million annually with 40-60 projects normally being active on a specific task component (survey, design, construction, etc.) on annual basis.

The group is in charge of County effort to compile a capital improvement plan (CIP) which involves identification of needs, grouping into projects, estimating cost to plan, design, acquire, and build roadway projects and related rights of way improvements. This plan is compiled and updated annually with inputs from various stakeholders within the County and external from Cities, school boards and citizens. The final plan preparation and compilation is done by this group with contribution from many groups within Public Works.

The general function of the group is outlined in Figure 2-38. The complete overall process with all steps is done on annual basis yet some projects steps make take multiple years to complete.

Initially based on inputs from internal and external sources needs are determined for both capacity and condition of existing roadway, drainage facilities. Analysis is done with help from the traffic planning group and others to determine specific projects to meet those needs. Cost estimates of all components along with specific timing and sequence of theses projects are made. This information is compiled into a detailed plan and though a detailed public involvement process obtains input from various parties. A resulting CIP is then prepared and processes though the Council and modified after Council actions, input and comment.

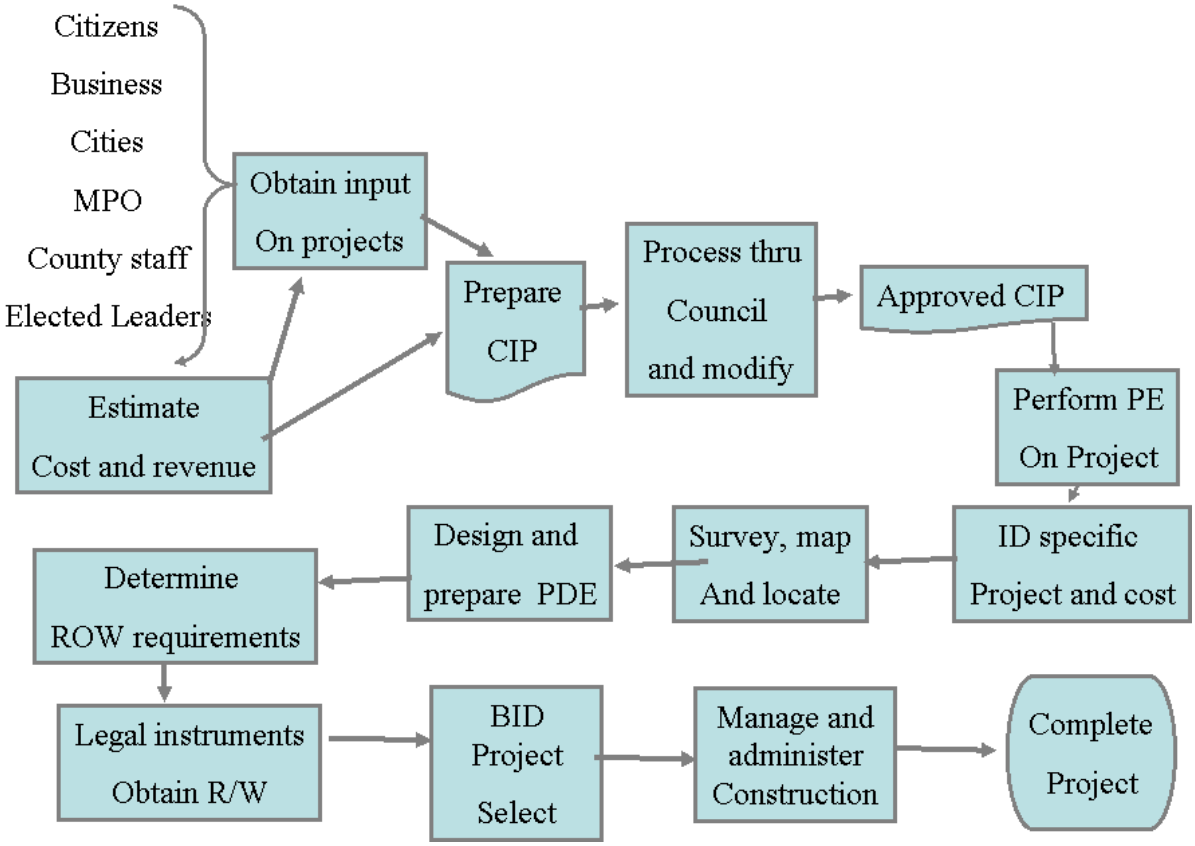

Figure 2-38 - Construction Engineering Functions

Next step is the preliminary engineering (PE) effort to completely scope the project location, components, and environmental impacts along with the determination of a more detail cost estimate and rights of way requirements. From this effort more specific project limits are determined. A explicate survey effort is then finished to locate proposed facility improvement with existing physical conditions of vegetation, utilities, roadways, structures, etc to outline current conditions. This information is then used to provide information for actual design of the improvements and preparation of construction plans, specifications and quantities and cost estimates (PDE) along with the necessary permitting with various regulatory agencies at local, state and federal levels.

After that effort design and permitting then land requirements for the placement of facilities and easements is determined. This then leads to preparation of legal instruments for obtaining properties allowing the specific projects to occur. The process of obtaining land rights involves many steps including negotiations, communication, offers and sometimes related legal processes to obtain theses rights. After completion of land acquisition or at least enough effort to obtain rights a complete bid packages is compiled and a competitive bid processes is untaken with assistance of purchasing. After selection and award of the selected contractor and finalized contract is accepted the construction processes is started. The County though the use of in-house construction inspectors monitors the compliance to plans, adherence to specification and County standards by contractors. Further, they administer the contract requirements and pay items to ensure proper work is associated with payment schedule. Upon completion of project to County

requirements the project is turned over to maintenance and Construction Engineering role ends. Any specific project may take multiple years from concept to construction to completion.

There are variations of this process as any roadway improvements done by other in existing rights of way such as developers as part of traffic mitigation for a development install turning lanes, signals, widening, drainage requires oversight by this group's project mangers and construction staff.

Also, a variation of this process is that design work and rights of way acquisition may be done by contractors or in-house or a combination of the two. Surveying having two crews does some in-house support work for other functions within the County and may be used even in construction surveying on an agency basis.

Construction management manages the pavement management program with recent utilization of contractor support to determine pavement condition applying the APWA MicroPAVER system. Prior to condition assessment efforts were done using a visual review and judgment by key staff member.

Administration support focus is on record keeping using a combination of internally developed and accounting systems and support for the actual CIP plan that is prepared and tracking of project status.

Rights of way group are responsible for many other functions but their main task is to acquire the necessary property to allow the CIP project to function. This effort may require considerable of process and even the legal involvement in a court process. A general outline of this process is shown in Figure 2-39 with the different steps taken to obtain and negotiate the rights of way.

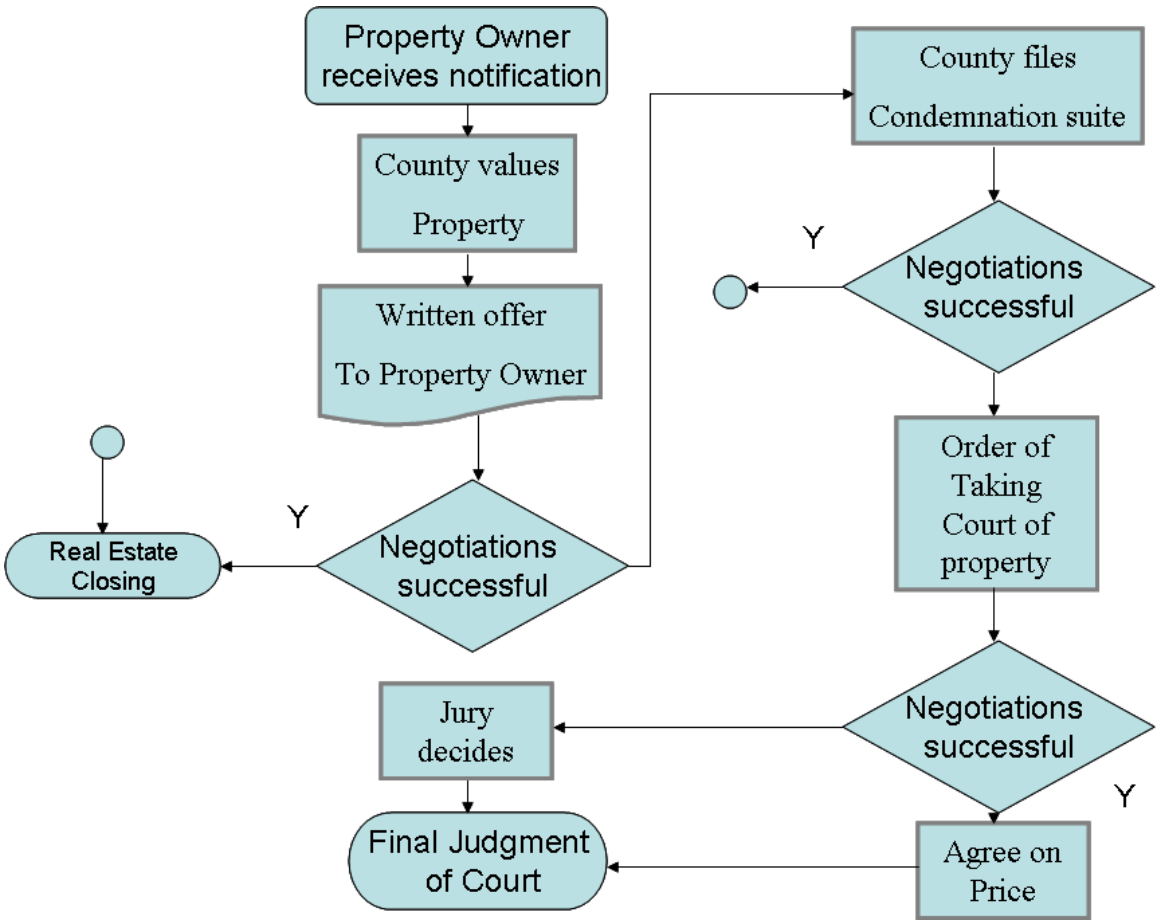

Figure 2-39 - Rights of way Acquisition

Stormwater Characteristics

The County has many Stormwater assets which include drainage ditches, retention ponds and outfalls. Stormwater is not managed as a separate division. Instead it is managed by a Stormwater Engineer and inspector engineer who are organizationally under the Water and Resources Utility Division with support form half time effort of the special projects manager position from administration. Much of stormwater work is actually performed by the Road and Bridge Division and the Mosquito Control division support.

Work that is performed by Road and Bridge Division and the Mosquito Control divisions is billed to the Stormwater fund. Nearly 4 million of the $4.75 adopted million dollar budget was reimbursable to them in FY05/06. Figure 2-40 demonstrates the operational reimbursable work by division. Road and Bridge performs the majority of reimbursable stormwater work with some being provided by Mosquito Control, Contract and Traffic. Road and Bridge performed $2.2 million of operational the reimbursable stormwater work in FY2005/2006. Additional work was done by R&B for capital projects.

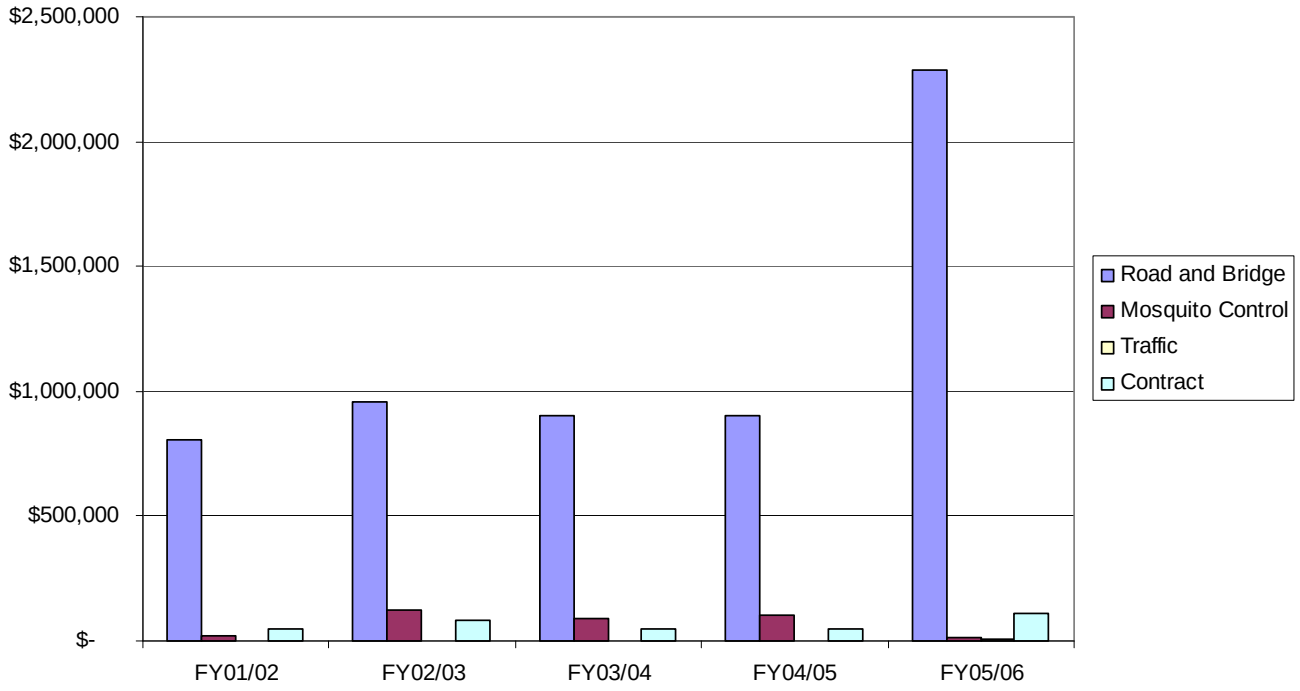

Figure 2-40 - Stormwater Reimbursement

It is often difficult for the divisions to clearly determine what work is considered stormwater and billable versus that which is already their direct responsibility. This is particularly true for Road and Bridge where some stormwater assets are located in the County right of way. The County ordinance No.92-89 states that storm assets are "…components which provide for collection and disposal of stormwater…" In addition, the County internal policy being now implemented outlines the responsibilities for stormwater utilities as 100% of retention ponds, 50% of cross drains, and 100% of outfalls.

Data for Stormwater management is tracked in two independent in-house developed databases. One of the databases is for managing stormwater requests and is monitored by the Special Projects Manager. There is also a second database that is used for monitoring inspections and maintenance required on ditches. The database provided information on erosion, vegetation and general comments. It could also be used for monitoring maintenance performed on a ditch.

Activities Performed

Volusia County performs a myriad of activities for all County infrastructures within Road and Bridges, Traffic Engineering, Mosquito Control, Water and Utility Operations, and Solid Waste.

Road and Bridges

Road and Bridges has established a list of activities used that are tracked to work orders and entered daily into the TIS system. Time recorded includes the entire time to perform the activity including both preparation and travel time. Using the TIS system, a comparison of work hours per activity was compiled. The analysis indicated that twenty-seven of the eighty-one performed activities accounted for 80% of the total work effort in hours (Figure 2-41). This is consistent with Pareto's statistical law stating that 20% of the work activities will account for 80% of the effort. The top ten activities in hours are bascule bridge operation, sidewalk work, install new drainage, pre-mowing/trim/litter removal, emergency- protective measures, retention mowing, routine tree trimming, supervisor planning/requests, litter removal, and tree work- remove.

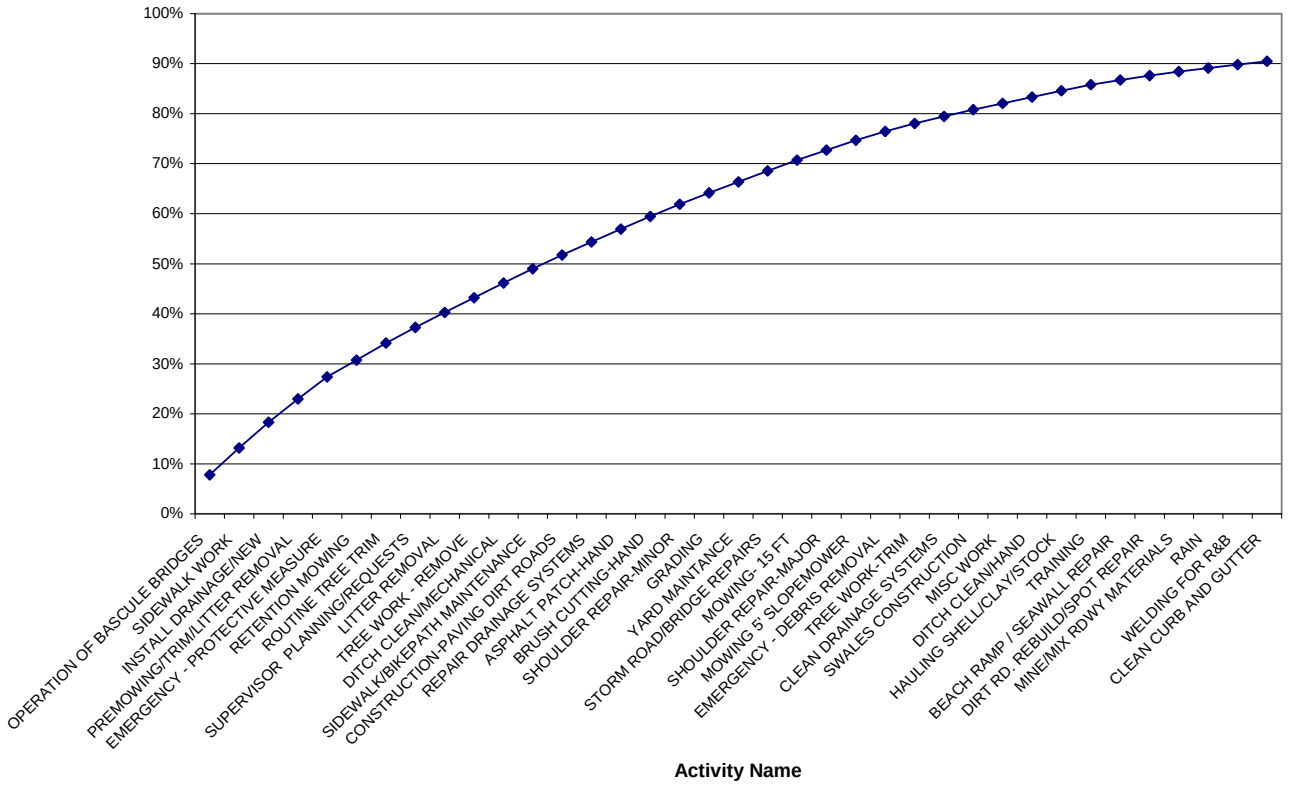

Figure 2-41 - Road and Bridges Activities

Traffic Engineering

Traffic Engineering uses the Primavera P3, project scheduling software, to track time to each work activity. Two of the twenty-one recorded activities accounts for 80% of the work effort (Figure 2-42). The top two activities for traffic signals are installation and equipment replacement.

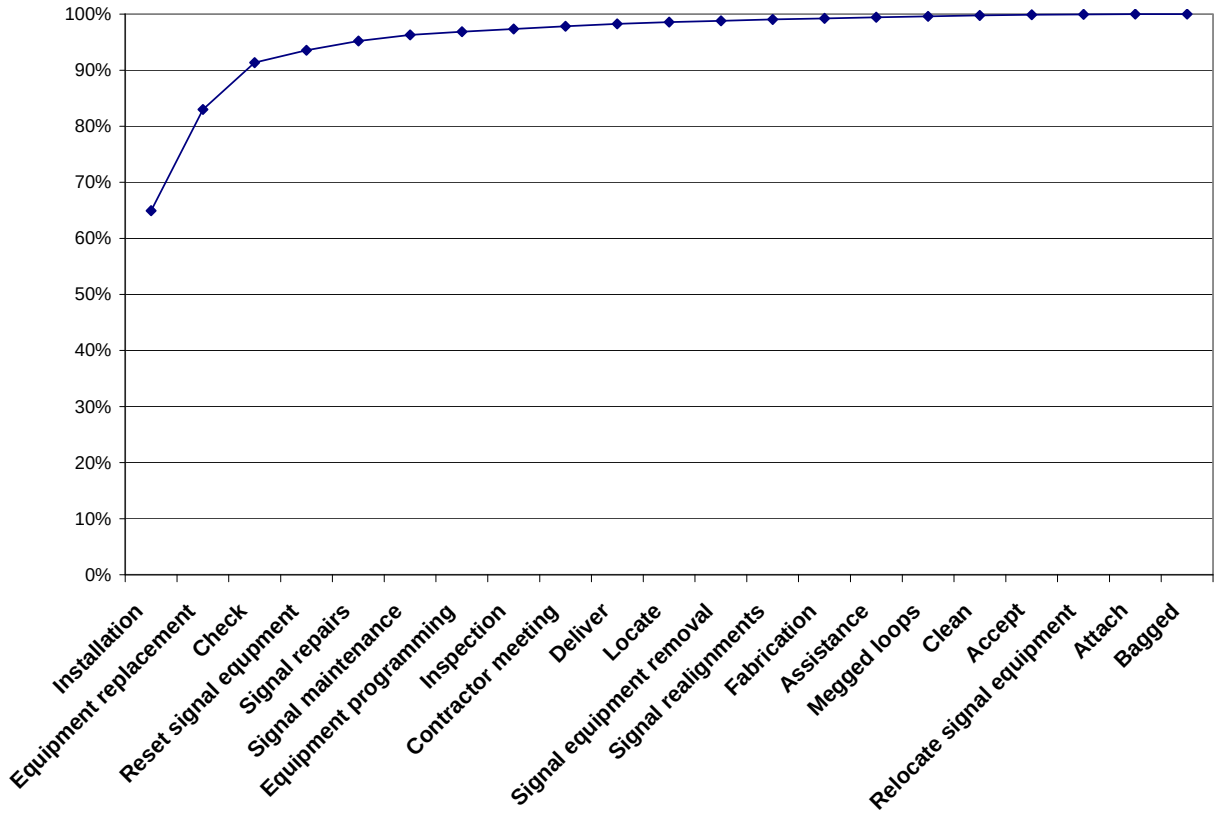

Figure 2-42 - Traffic Engineering Signal Activities

Sign activities have four of the thirteen recorded activities accounting for 80% of the effort (Figure 2-43). The top four activities are repair, installation, removal, and replace.

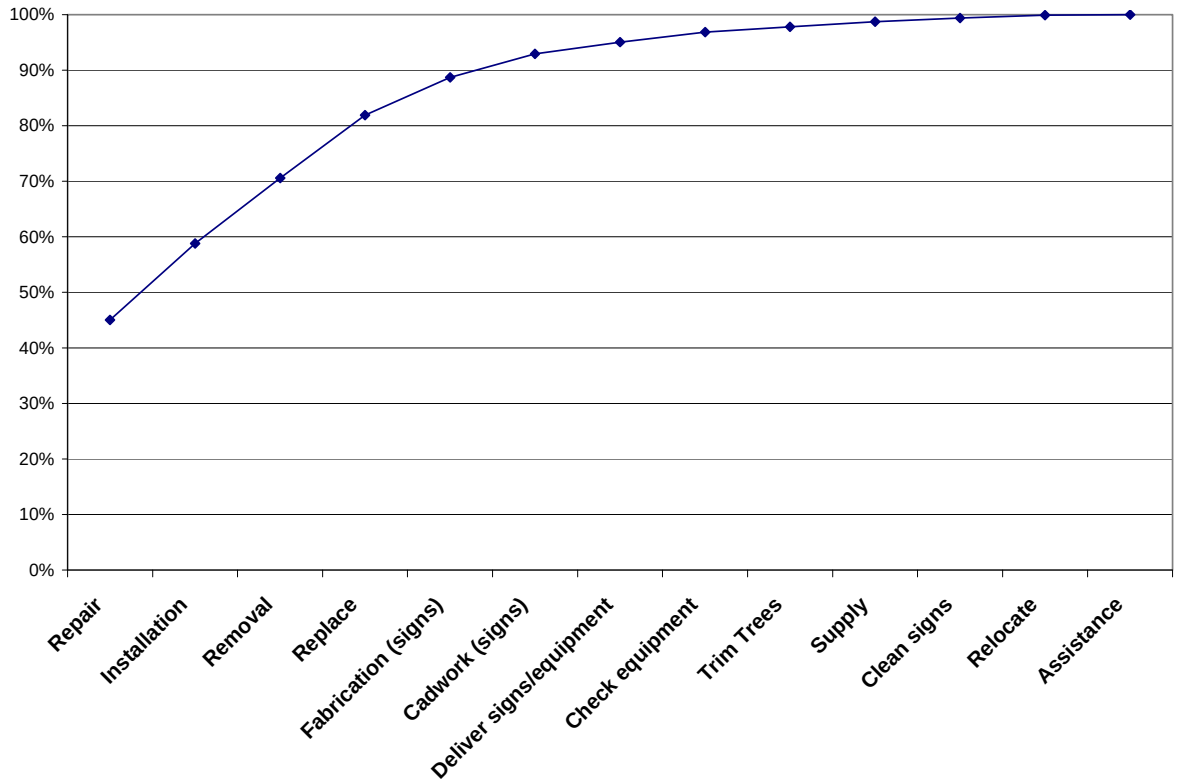

Figure 2-43 - Traffic Engineering Sign Activities

Mosquito and Vegetation Control

Mosquito Control

Mosquito Control uses multiple systems to track activity time and various by subgroups with the group. A Primavera system tracks some of the work performed for the billable heavy equipment work. Other time is tracked in a combination of MS Excel spreadsheets and paper copy. This information was tracked by job code and could not be associated by activity. Information did include accomplishment by job and hour spent by personnel on the job. Vegetation Control tracks all time to the internally created herbicide MS Access program. Analysis was performed to compile the time spent for each activity in Mosquito Control inspection. Four of the twelve recorded activities account for 80% of the entire effort in hours for Mosquito Control inspection utilizing and MS Excel spreadsheet from the supervisor in the New Smyrna Beach yard (Figure 2-44). Data on inspector activities was unavailable for the Daytona Beach Yard. The top activities were floodwater inspection, landing rates, Trapping, and administration. Floodwater Inspection is about 33% of the entire effort.

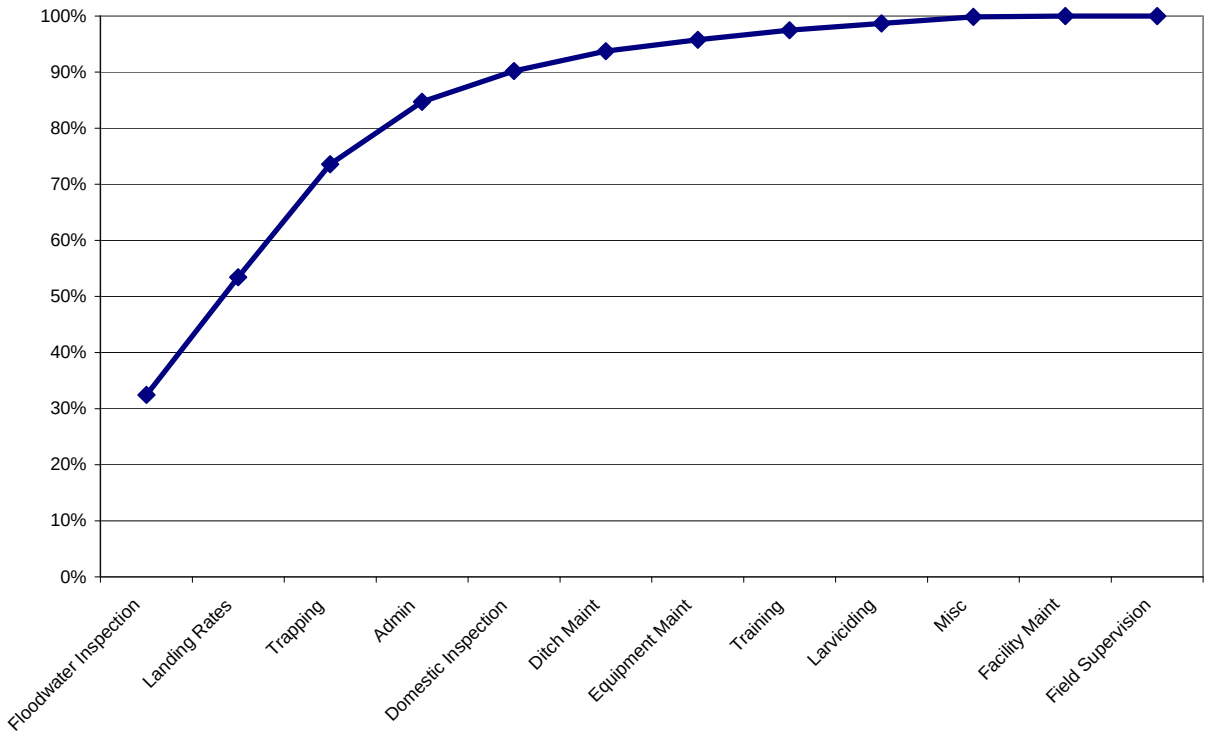

Figure 2-44 - Mosquito Control Activities

Vegetation Management

Vegetation Management has seven of the twenty-six recorded activities accounting to 80% of the total effort (Figure 2-45). The top activities are pepper maintenance, aquatics, personal leave/Sick, training/class, retention area, hand clean ditch, and roadside ditch. Pepper tree maintenance accounts for 24% of the overall effort.

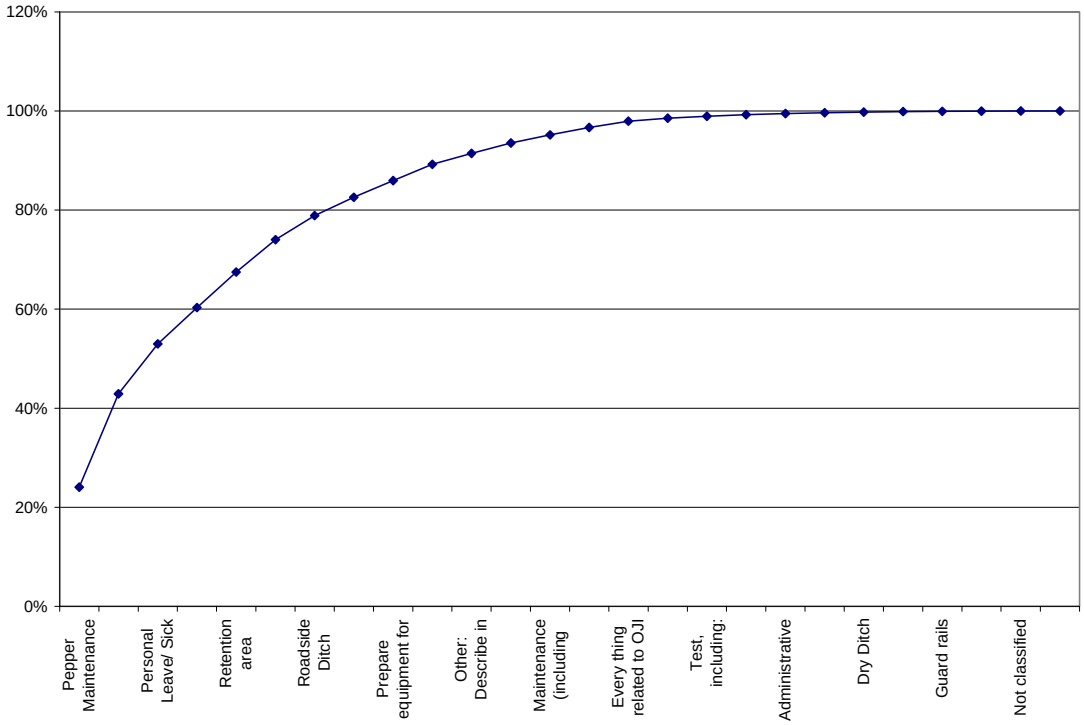

Figure 2-45 - Vegetation Management Activities

The hand ditch spray activity represented 7% of the entire effort for Vegetation Management. The monthly distribution of linear feet sprayed and cleaned varies greatly between March 2005 and March 2006 for the vegetation crew (Figure 2-46). October and December of 2005 as well as January and February of 2006 had no hand ditch spraying performed. Most other months had between 175 and 1,300 linear feet cleaned. September 2005 was the exception with 8,100 linear feet cleaned.

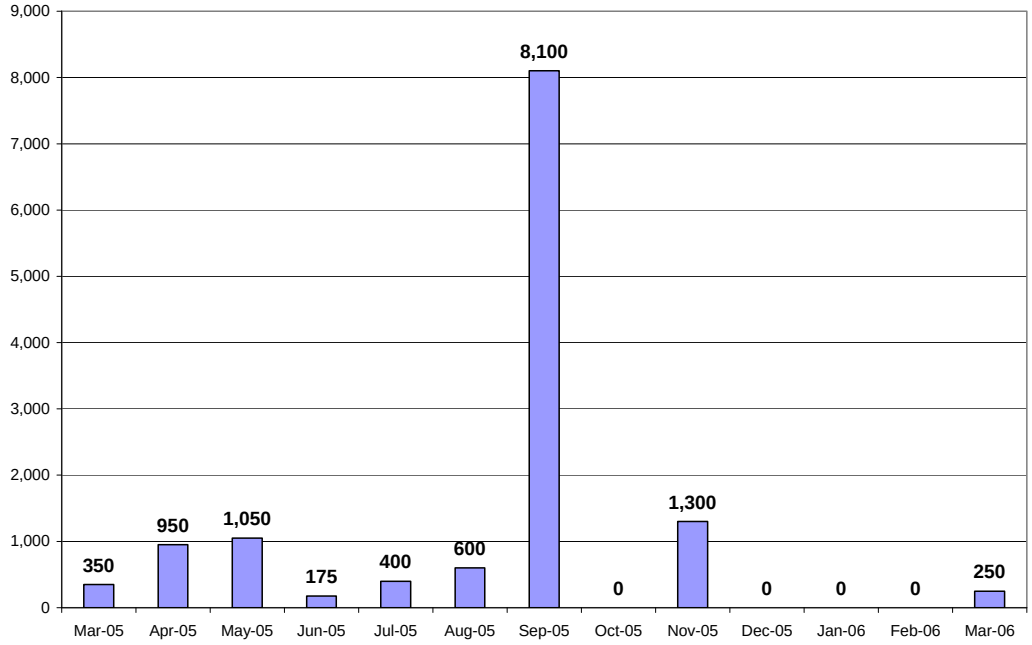

Figure 2-46 – Linear Feet (LF) of Hand Ditches Cleaned

Further the Ditch crew tracks their work in the Primavera systems by job number. Figure 2-47 provides the major jobs performed by the Ditch cleaning crew. The job numbers correspond to a location or channel. 7 of 75 job codes accounted for 80% of the work performed in June 05 through May 06. During this time period the Ditch Cleaning crew tracked 155,847 LF of ditches cleaned.

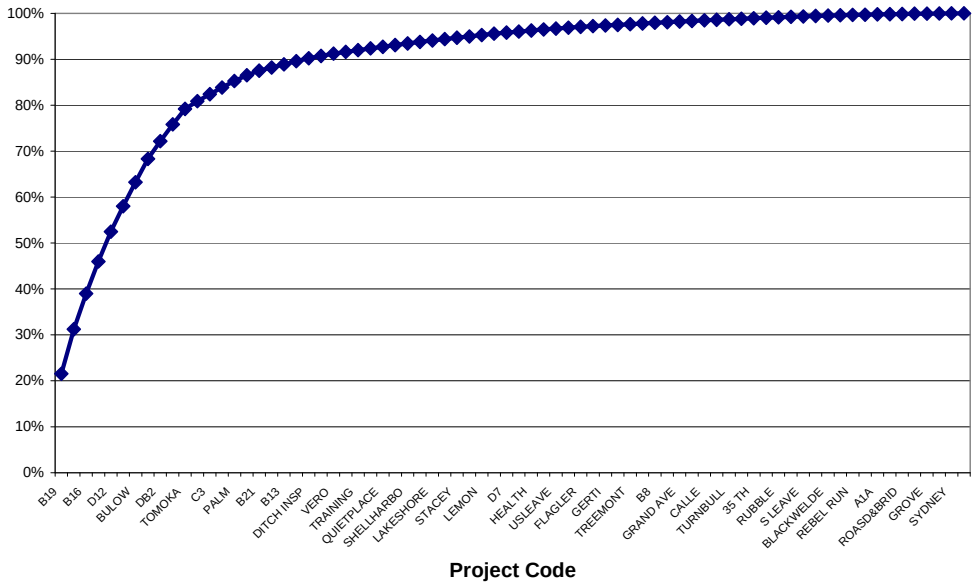

Figure 2-47 - Mosquito Control Ditch Cleaning Activities

Water Resources and Utility Operations

Water Utilities currently tracks their time in the off the self AllMax work order system. Analysis of the hours recorded to each activity shows that six of the fifty-two recorded activities account for 80% of the total effort. The top activities are locate water and sewer, install 5/8 meter, lift station problem, final Inspection, install reclaimed water, and install/replace backflow (Figure 2-48). Locating water and sewer lines account for over 60% of all time and over 70% of all water utilities work orders.

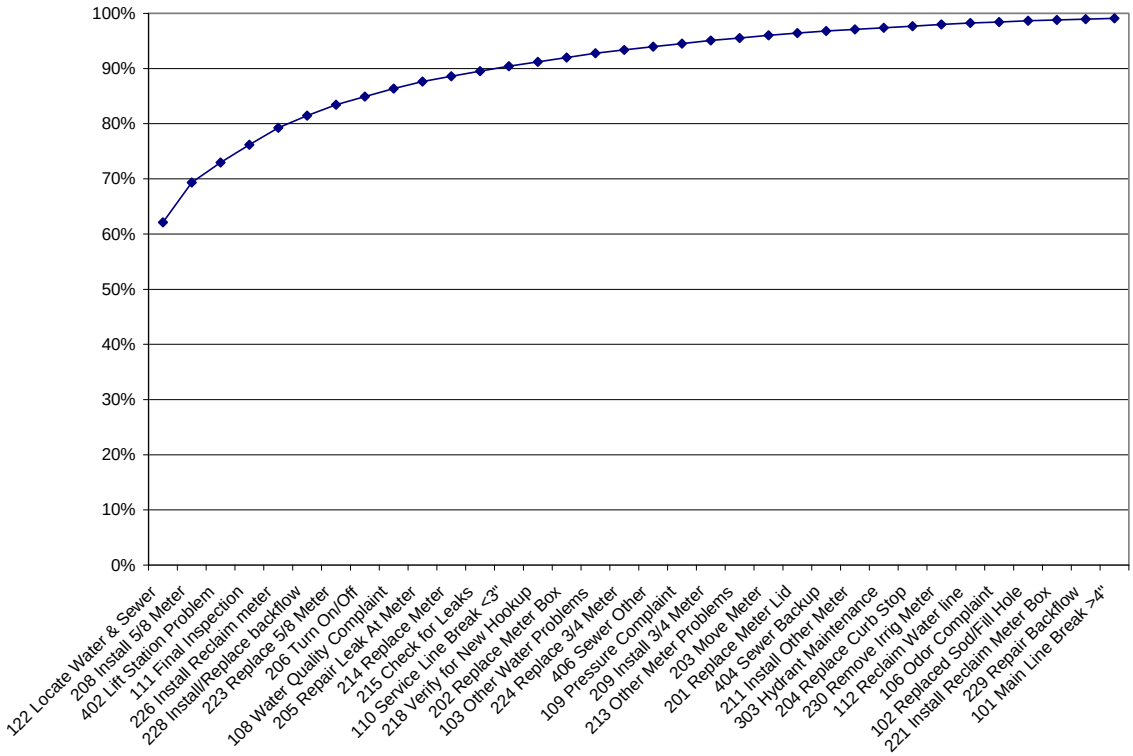

Figure 2-48 - Water Utility Activities

Solid Waste

Solid Waste utilizes the internally created TIS, but does not track time to specific activities. Instead, the TIS system is used to track citations. Through interviews, County provided information and general observations, a list of major activities were compiled (Table 2-4). Ground Cover appears to be the key function in Solid Waste. Each day the top of each cell must be covered and this appears to be major use of regular and overtime hours.

Table 2-4 - Solid Waste Activities

Motorgrading	Irrigation
Dozing	Landscape Maintenance
Backhoe operations	Roadway Maintenance
Hauling Cover	Well Monitoring
Loading	Sludge Pit
Sorting(Household, Recyclable & Hazardous)	Enforcement
Compacting	Waste Educations
Spotting & Directing	Drainage Maintenance
Mowing	Water Truck Operation
Turf Cultivation	Ground Cover

The Public Works Department utilizes a line item budget based on historical expenditures and anticipated needs of the Department. Each department submits their own budget which is combined to create the Pubic Works Department Budget. Revenue for the budget comes from a variety of sources. In general the transportation trust revenue from Gas tax and impact fees is utilized by Traffic Engineering, Road and Bridge and Constructions engineering. Key Funding Sources by Public Works Division have been summarized below.

- Solid Waste
  - Tipping Fees and Annual Collection Fees
  - Recycling Sales
  - License and Permit Fees
  - Intergovernmental Revenues
- Road & Bridge
  - Contract work for Cities
  - Intergovernmental Revenues
  - Gas Tax
- Traffic Engineering
  - Contract Work for Cities
  - Transportation Impact Fees
  - Gas Tax
- Water and Utility Operations
  - Utility Billing Fees
  - Intergovernmental Revenues
- Construction Engineering
  - Transportation Impact Fees
  - Gas Tax
- Mosquito/Veg. Control
  - Contract Work for Cities
  - Intergovernmental Revenues

In addition to compiling a line item budget each division provides a list of performance measures that it expects to accomplish. The performance measures are included in the final County budget but do not link cost of the performance measures to the actual budget. A list of the performance measures for the FY 2005 budget has been provided below.

- Construction Engineering Key Objectives
  - Percentage of Projects on Schedule – 85%
  - Percentage of Goals Achieved – 85%
- Road & Bridges Performance Measures
  - Number of days to grad dirt roads – 10 days
  - LF of stormwater pipe installed– 3,055
  - Cost per acre to mow - $70

- Traffic Performance Measures
  - Number of Signals Maintained - 392
  - Number of Signs Installed of R&R – 10,000
  - Number of Miles Striped – 130
- Solid Waste Performance Measures
  - Number of residential Served – 41,973
  - Percent of satisfactory complaints resolved – 99%
  - Percent of residential waste collected for recycling – 39%
- Utilities Performance Measures
  - Feet of drainage pipe replaced – 8,500
  - Number of meeting with the public per year – 6
  - Acres of Land Acquisition – >10
  - Number of interlocal agreements- 5

LAC used the Engineering News and Record (ENR) construction index to adjust all of the Division budgets from FY 2001-02 to FY2004 -05 in 2005 dollars. This allows the budget to be reviewed in constant dollars without the impact of inflation. Overall, the Water budget increased 58.8% between 2001 and 2005 or 14.7% annually. Figure 2-49 demonstrates the budget increase for each division from FY 2001-02 to FY2004-05. The Construction Engineering budget increased 99%, Mosquito Control and Vegetation 17%, Administration 18%, Road and Bridges 8%, Solid Waste 36%, Traffic Engineering 2% and Water Resources and Utilities 18%. The increase in the Construction Engineering Budget is as a result of an increase in Capital Project Funding.

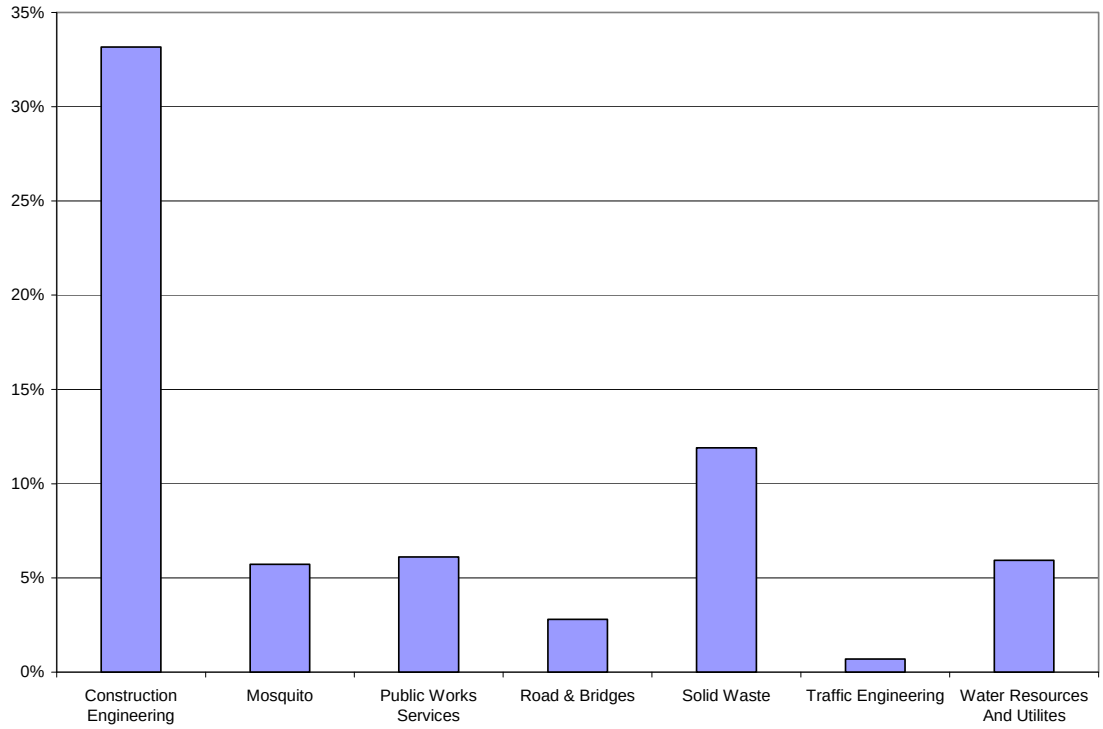

Figure 2-49 - Budget Increase by Division

Public Works Services

The Public Works Services Budget which includes administration was adjusted to constant 2005 dollars using the ENR construction index. The budget for FY2004-05 was $1,842,176. The budget has increased 18.34% since FY2001-02. This equates to an average annual increase of 6.11%. The FY2004-05 budget decreased 4% in constant dollars from the estimated FY2003-04 budget. Figure 2-50 demonstrates the Public Works Services Budget.

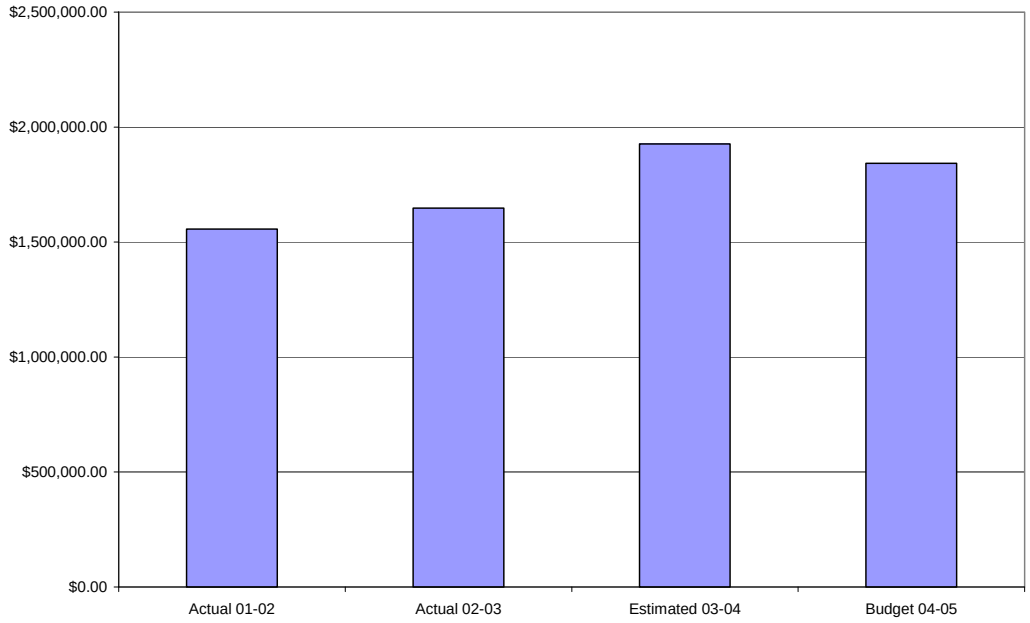

Figure 2-50 - Public Works Services Budget

Road and Bridge

The Road and Bridge Budget was adjusted to a constant 2005 dollars using the ENR construction index. The budget for FY2004-05 was $14,401,153. The budget has increased 8.4% since FY2001-02. This equates to an average annual increase of 2.8%. The FY2004-05 budget decreased 3% in constant dollars from the estimated FY2003-04 budget. Figure 2-51 demonstrates the Road and Bridge Budget.

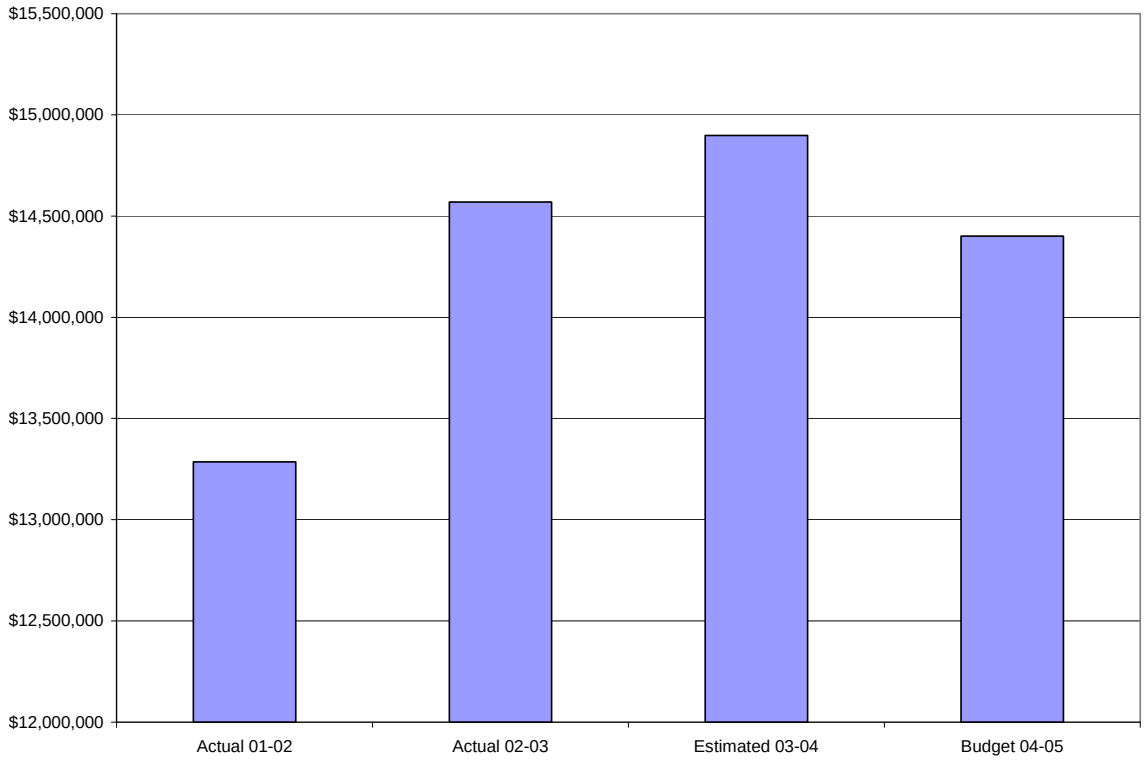

Figure 2-50 - Road and Bridge Budget

Traffic Engineering

The Traffic Engineering Budget which includes signs, signals, markings and traffic planners and engineering was adjusted to constant 2005 dollars using the ENR construction index. The budget for FY2004-05 was $3,695,519. The budget has increased 35.69% since FY2001-02. This equates to an average annual increase of 11.90%. The FY2004-05 budget decreased 4% in constant dollars from the estimated FY2003-04 budget. The estimated FY 2003-04 budget increased 7% from the previous year's budget while the actual FY 2002-04 budgets decreased from the actual 2001-02 budget. The budget has been fluctuating in constant 2005 dollars. Figure 2-52 demonstrates the Traffic Engineering Budget.

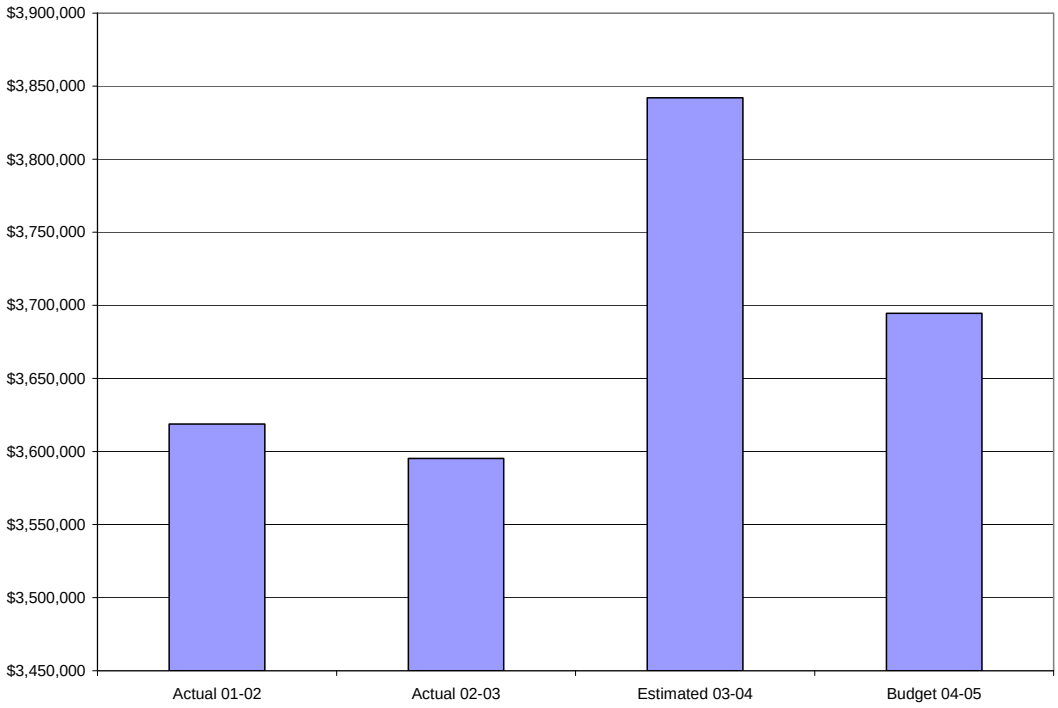

Figure 2-51 - Traffic Engineering Budget

Mosquito Control and Vegetation

The Mosquito Control and Vegetation Budget were adjusted to constant 2005 dollars using the ENR construction index. The budget for FY2004-05 was $6,187,579. The budget has increased 17.16% since FY2001-02. This equates to an average annual increase of 7.72%. The budget has been on the rise since the actual FY2002-03 budget. The FY2004-05 budget increased 25% in constant dollars from the estimated FY2003-04 budget. In the years reviewed the actual FY 2002-03 was the only year to decrease from the previous year in 2005 constant dollars. Figure 2-53 demonstrates the Mosquito Control and Vegetation Budget.

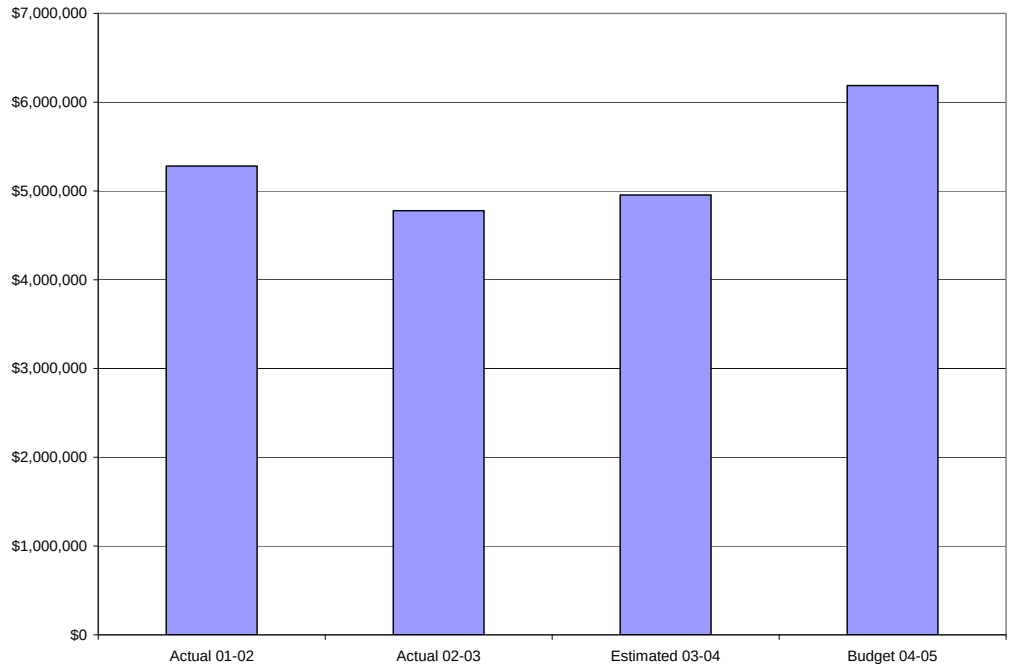

Figure 2-53 - Mosquito Control and Vegetation Budget

Water Resources and Utilities

The Water Resources and Utilities Budget were adjusted to a constant 2005 dollars using the ENR construction index. The budget for FY2004-05 was $19,876,027. The budget has increased 17.79% since FY2001-02. This equates to an average annual increase of 5.72%. The budget increased in constant 2005 dollars each of the years LAC reviewed. Figure 2-54 demonstrates the Water Resources and Utilities Budget.

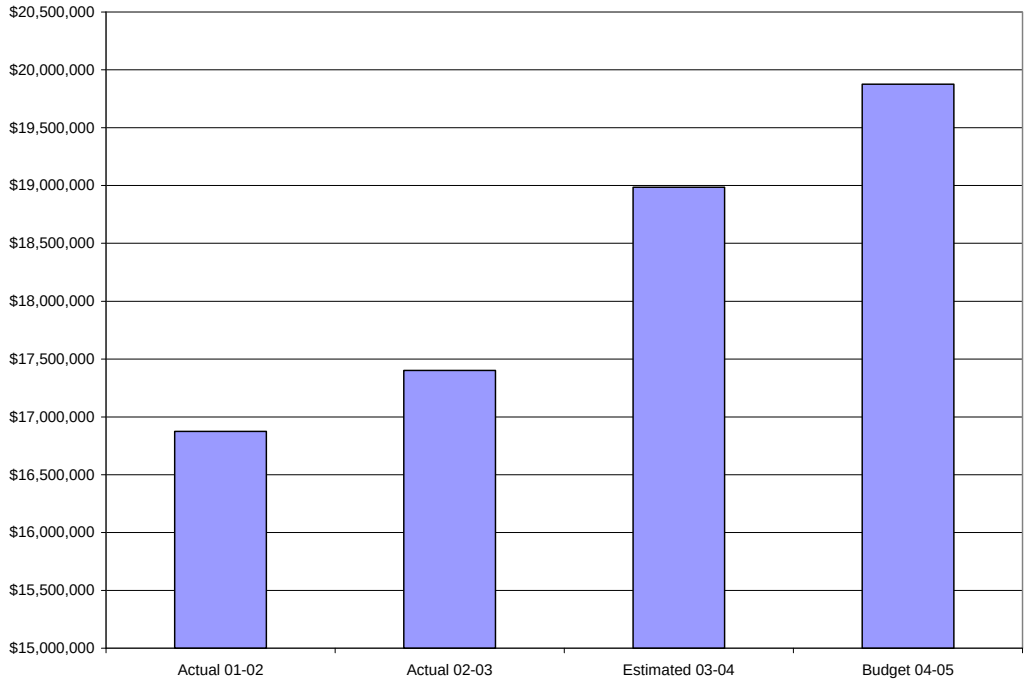

Figure 2-52 - Water Resources and Utilities Budget

Solid Waste

The Solid Waste was adjusted to constant 2005 dollars using the ENR construction index. The budget for FY2004-05 was $29,863,465. The budget has increased 35.69% since FY2001-02. This equates to an average annual increase of 11.90%. The FY2004-05 budget increased 4% in constant dollars from the estimated FY2003-04 budget. The largest increase occurred from the actual FY2001-02 budget to the actual FY2002-03. During this time period the budget increased 19.79%. The budget increased in constant 2005 dollars each of the years LAC reviewed. Figure 2-55 demonstrates the Solid Waste Budget.

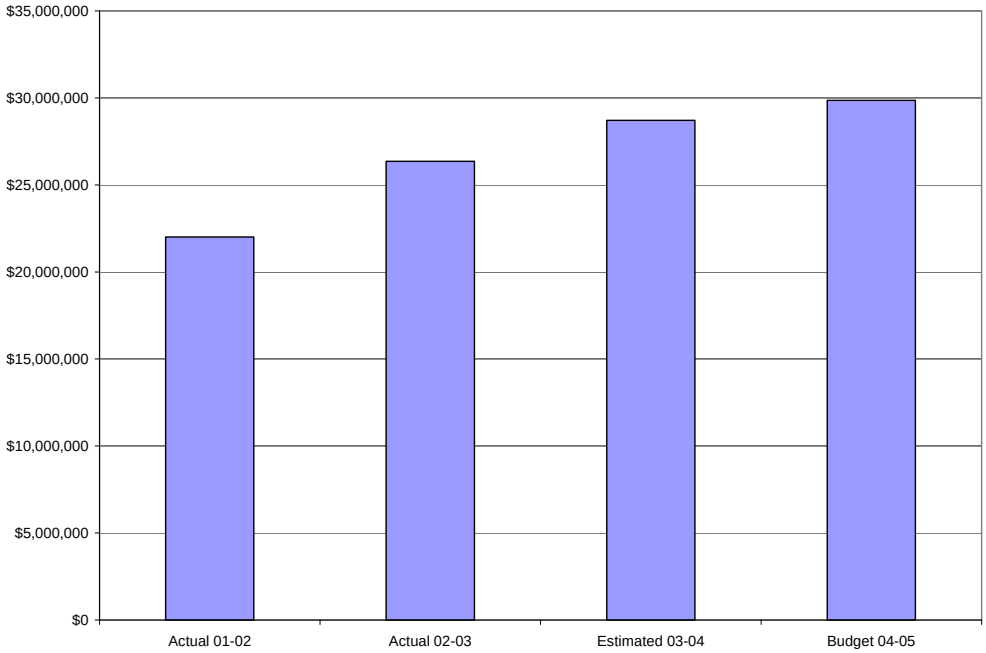

Figure 2-53 - Solid Waste Budget

Construction Engineering

The Construction Engineering Budget which includes administration was adjusted to constant 2005 dollars using the ENR construction index. The budget for FY2004-05 was $32,105,271. The budget has increased 99.53% since FY2001-02. This equates to an average annual increase of 33.18%. A dramatic increase occurred from Actual FY2002-03 to the estimated budget in FY2003-04. The budget increased 94.36% during this time period. This was as a result of an increase in capital improvement funding available though a recent approved bond funding measure. The FY2004-05 budget decreased from the estimated FY2003-04 budget 13.82% (Figure 2-54).

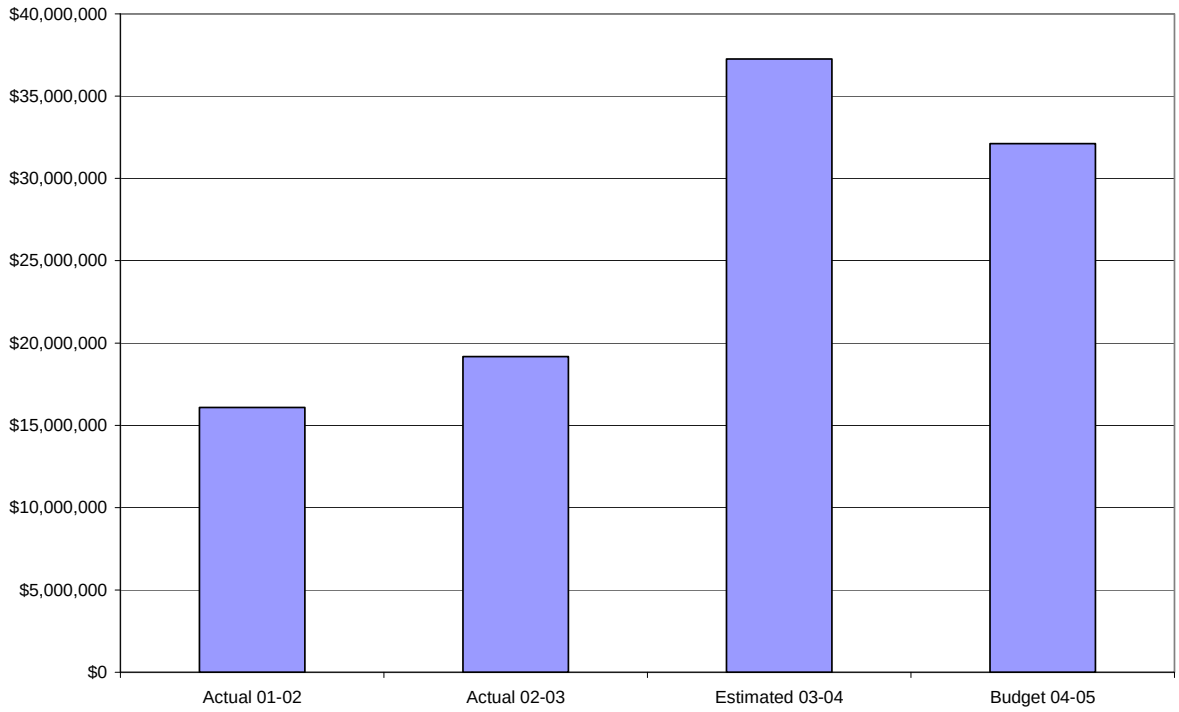

Figure 2-54 - Construction Engineering Budget

Overhead

The Public Works Administrative sections fiscal personnel, who are responsible for creating and monitoring the budget, also calculates the County's annual overhead rate. In general three separate overhead rates are calculated for each division. The separate rates calculated are for internal charges within Public Works, internal charges within the County and charges external to the County. Mosquito Control and Vegetation actually have six overhead rates as separate rates are calculated for both mosquito control and for vegetation/ditch crews. Water Resources only calculates the overhead rate for external charges. Table 2-5 shows the different overhead rates by Division. The average internal public work overhead is 142%, the average internal County overhead is 150% and the average external overhead rate is 180%. This means that for every $10 hourly rate when billed to a department within public works on average becomes $24.20, when billed to a department within the County but outside of Public Works on average becomes $25.00 and when billed to someone outside the County becomes $28.00. Figure 2-55 show the overhead rates for each division and the yellow line represents the average rate for external billing, the maroon line represents the average rate for billing within the County and the blue line represents the average rate for charges within public works. A fourth rate is charged for all division for FEMA. The FEMA overhead rate is 47.3% for regular time and 17.7% for overtime. While overhead rates exist which have been established by the Fiscal Division, Mosquito Control is not currently directly using these rates. Mosquito Control uses a rate which in judgment of Mosquito Control management is a combination of the internal Ditch and Mosquito Control rates developed by Fiscal.

Table 2-5 - Overhead Rates by Division

	Inside PW	Inside County	External
MC	163%	179%	256%
MC- Ditch	81%	95%	163%
R&B	127%	130%	154%
Const. Eng.	219%	224%	242%
Traffic Eng.	125%	132%	155%
Solid Waste	135%	137%	159%
Utilities			132%

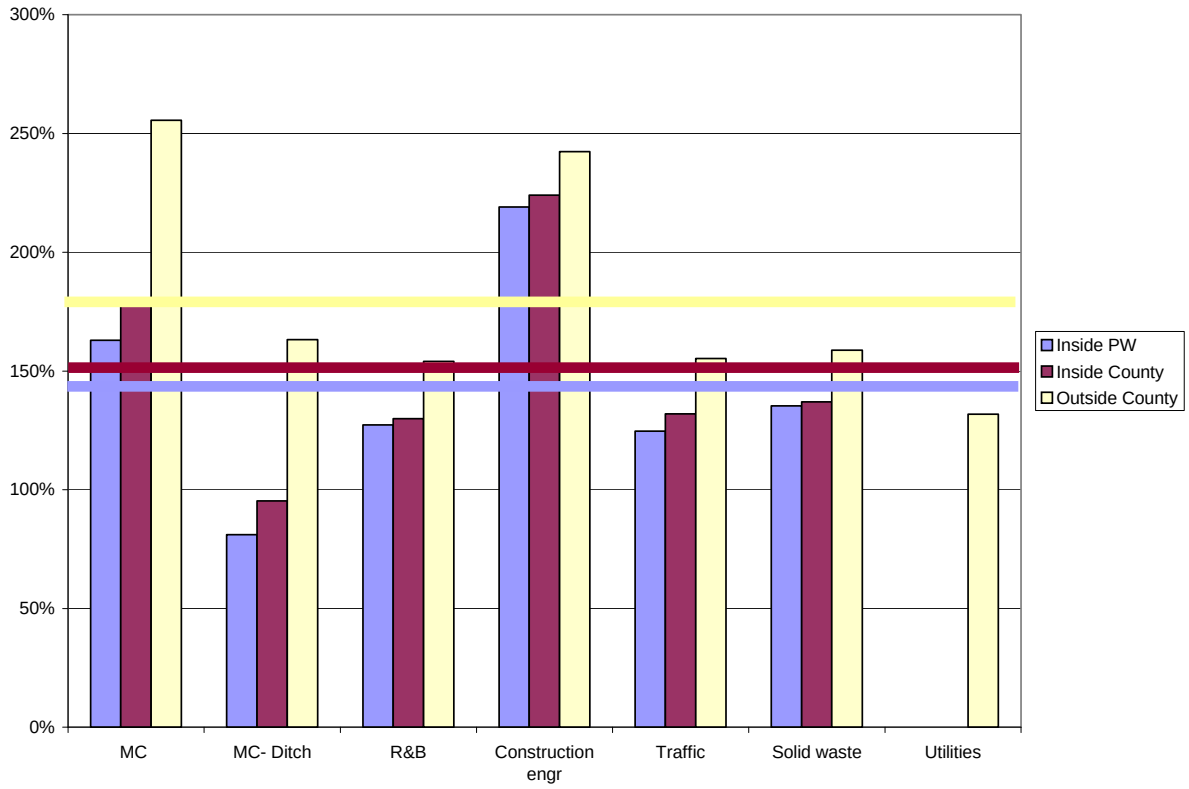

Figure 2-55 - Overhead Rates by Division with County Average

In addition to applying and overhead rate to hourly charges the County applies and overhead rate to materials for a handling fee. The average material overhead is 13.32% for all divisions. Utilities has the highest material charge applied of 33%, followed by Traffic Engineering (14%), Road and Bridge (11%), Solid Waste (10%), Mosquito Control (7%) and Mosquito Control-Ditch (4%). Figure 2-56 compares the material overhead rates between the divisions of Public Works.

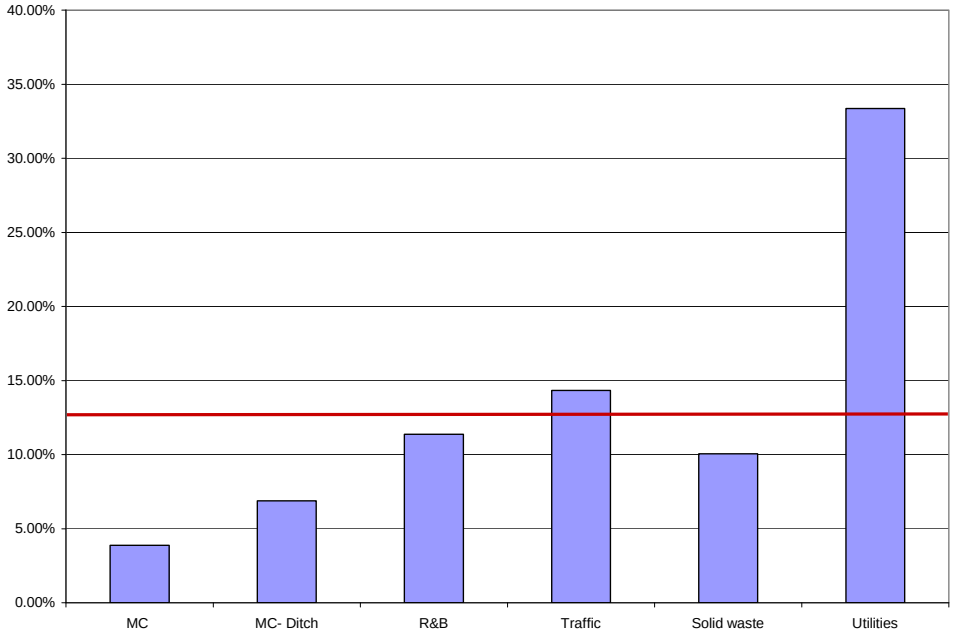

Figure 2-54 - Material Overhead Rates

Stormwater Budget

Although stormwater is not a separate division it has its own separate budget fund and unique funding source. The information in Figure 2-57 shows the budget growth for FY 2004 Actual through the current estimate. The Stormwater budget was adjusted to constant 2005 dollars using the ENR construction index. The current adopted expenditure budget for stormwater is $4.75 million with estimated actual expenditure to be closer to 5 million dollars. There was a dramatic increase in the actual 2005 to the current adopted budget. This appears to be due to an increase in the maintenance activities and local projects line items. Between FY 2004 and FY 2005 actual the budget increased 3.5%. Between the 2005 actual and the adopted budget there was a 110% increase in expenditures.

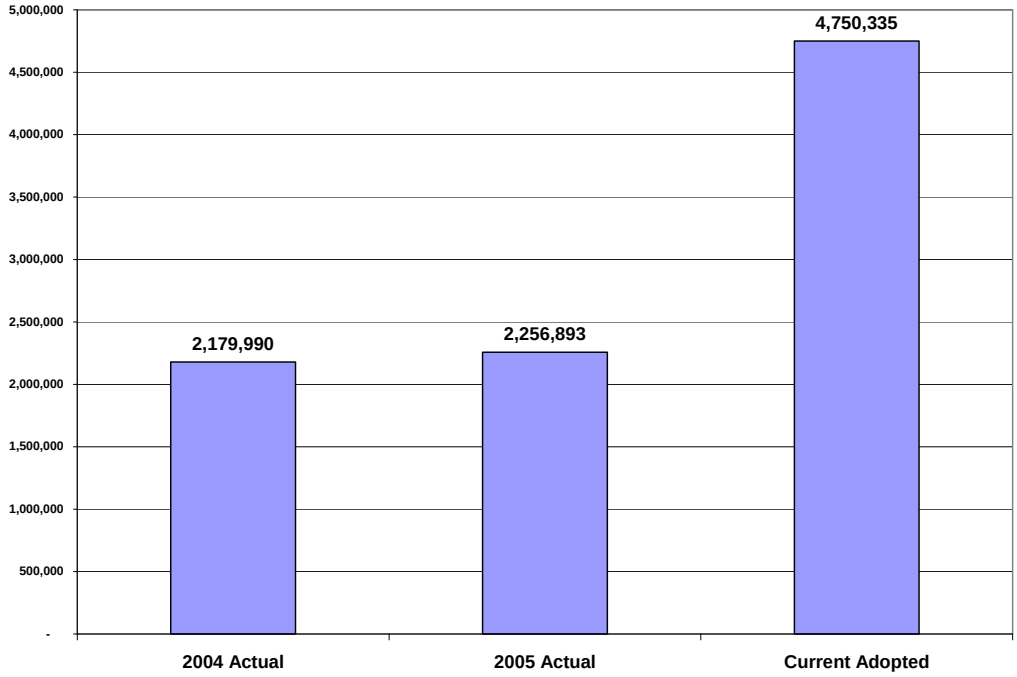

Figure 2-57 - Stormwater Expenditures

Organization

The Public Works Department is a multiple layered organization. Figure 2-59 represents the organization for senior management and leadership or the County. There are three levels of management above Public Works Director which includes the County Council, the County Manager, and the Deputy County Manager. The following organization information was in existence at start of the report compilation.

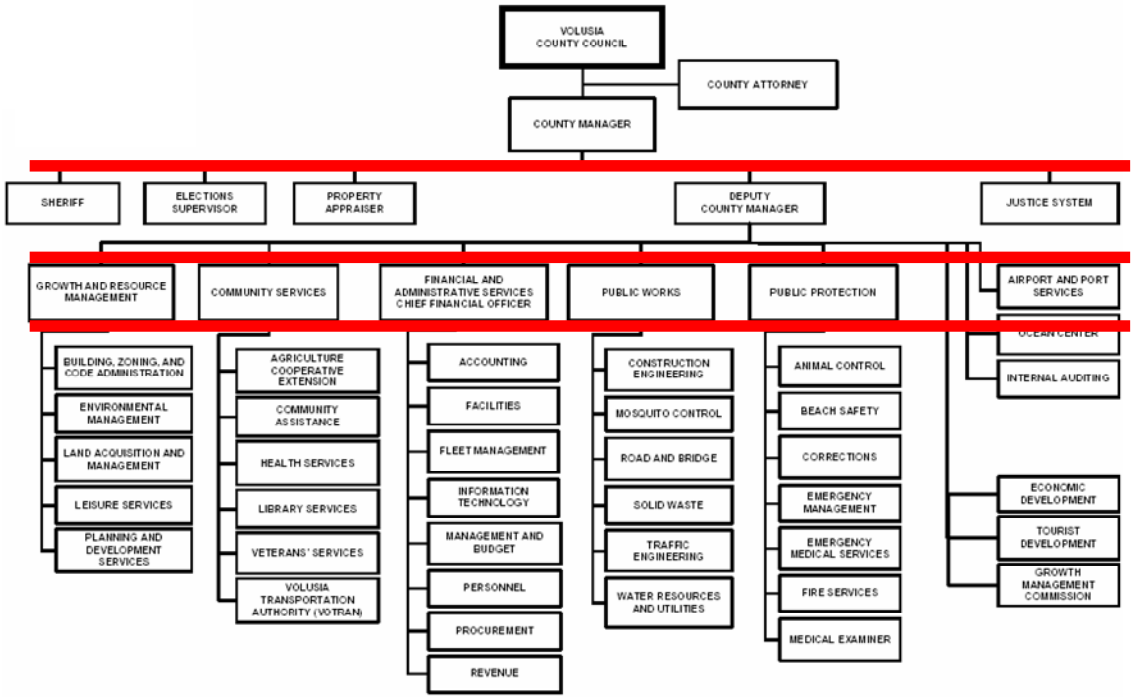

Figure 2-59 - Volusia Upper Organizational Levels

Figure 2-60 represents the upper level management layers of the Public Works Department. The agency has seven structural divisions that report to the Director of Public Works. Public Works Director has eight direct reports with two staff and six line positions.

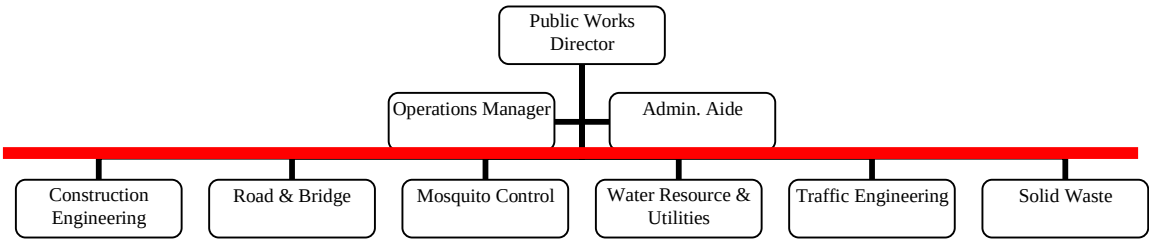

Figure 2-60 - Public Works Management

The span of control between the Public Works Director and Division mangers and administrative aide is 1:8.

The Department of Public Works is managed by the Director of Public Works and is divided into seven divisions which are functionally classified as depicted above. The general responsibilities for the seven divisions are as follows:

- Public Works Administration – The administrative unit is divided includes the Public Works Director, Operations Manager, Fiscal Resource Manager, and 2 Special Project Managers. Responsibilities in general include providing

management and support to other divisions. In addition this division compiles and monitors the Public Works budget and calculates overhead oversees contracts and special projects and assists with GIS and database needs.

- Road and Bridge – Road and Bridge is responsible for maintaining the County's roadways, mowing, cemeteries, and bridges. Work includes support for stormwater assets.
- Mosquito Control– Mosquito Control crews are responsible for the abatement of mosquitoes through inspection, chemical control (truck & helicopter), monitoring traps and chickens. The vegetation crew is responsible for biological control, chemical control and abatement of vegetation. Mosquito Control also has a separate crew to for stormwater and cleaning of ditches.
- Construction Engineering – Construction Engineering's main responsibility is to develop 5 year capital improvement plan utilizing planning, survey, design, right of way and construction management employees.
- Water Resource and Utilities – Water Resources and Utilities is responsible for maintaining water and sewer treatment plants, water quality, utility billing, water distribution lines, sewer collections lines and adjoining assets such as manholes and meters. The engineer responsible for stormwater is under the Water Resources and Utilities division.
- Traffic Engineering – Traffic engineering is responsible for maintaining signs, signal and markings. In addition, Traffic Engineering has two planners sharing one full-time position and traffic engineers who perform traffic studies and control or monitor signal timings.
- Solid Waste – Solid waste is responsible for the Tomoka Landfill, the transfer station, consumer waste collection recycling and educational programs.

The Public Works Administration division reports directly to the Public Works Director and has one additional layer of management. The span of control between the Operations Manager and his direct reports is 1:3. This is outlined in Figure 2-61.

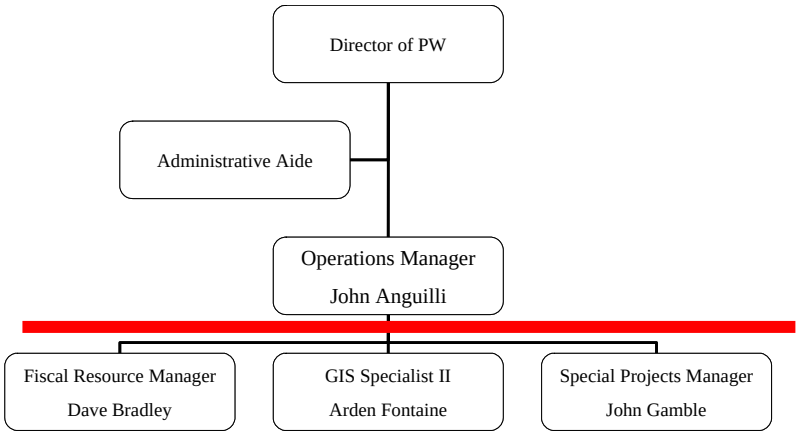

Figure 2-61 - Public Works Administration

The Road and Bridge Director reports directly to the Public Works Director and has four additional layers of management. Figure 2-62 outlines the organization for Road and Bridges and the layers of management.

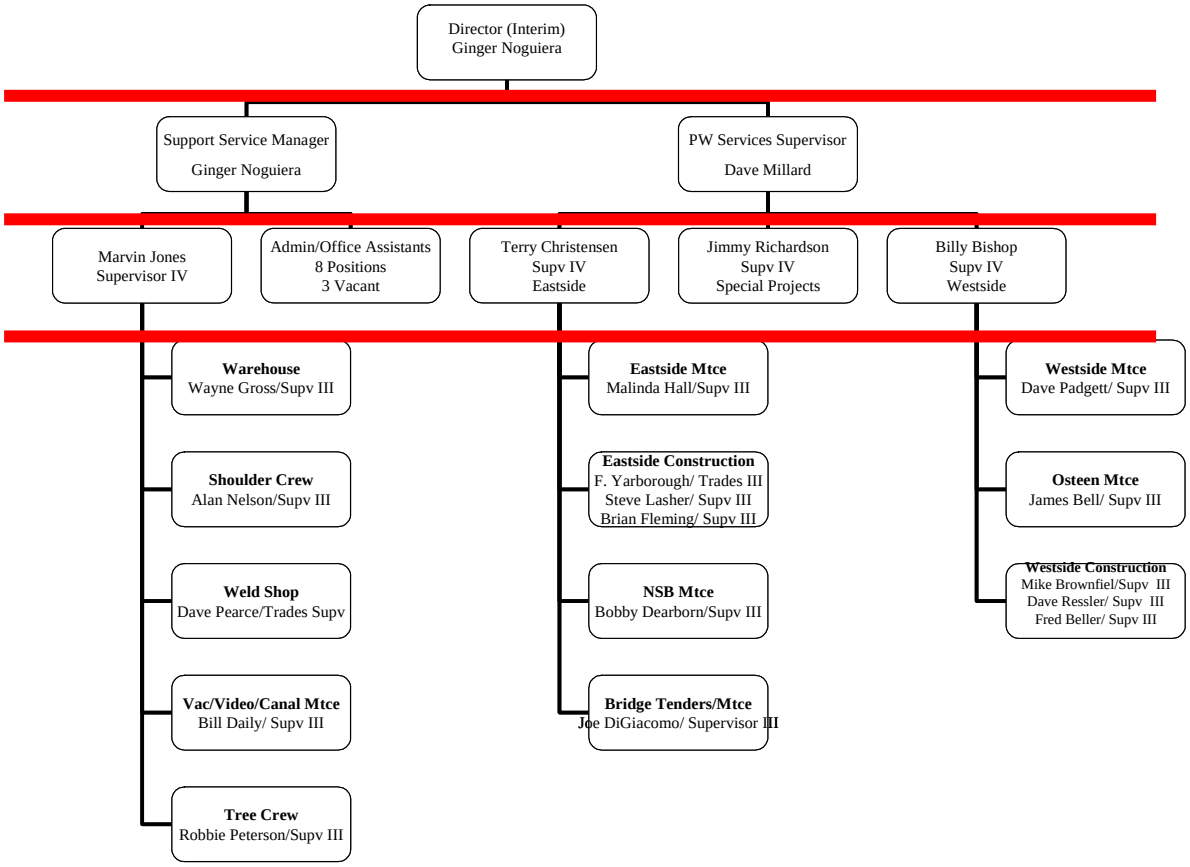

Figure 2-62 - Road and Bridges Organization

The span of control for the Road and Bridge Layers is as follows:

- Director to Manager/Supervisor – 1:2
- Manager/Supervisor to Supervisor IV or office admin staff – 1:3 to 1:12

- Supervisor IV to Supervisor III – 1:1, 1:5 to 1:6
- Supervisor to Direct Reports – 1:3 to 1:21

Traffic Engineering

The Traffic Engineer reports directly to the Public Works Director and has three additional layers of management. Figure 2-63 outlines the organization for Traffic Engineering and the layers of management.

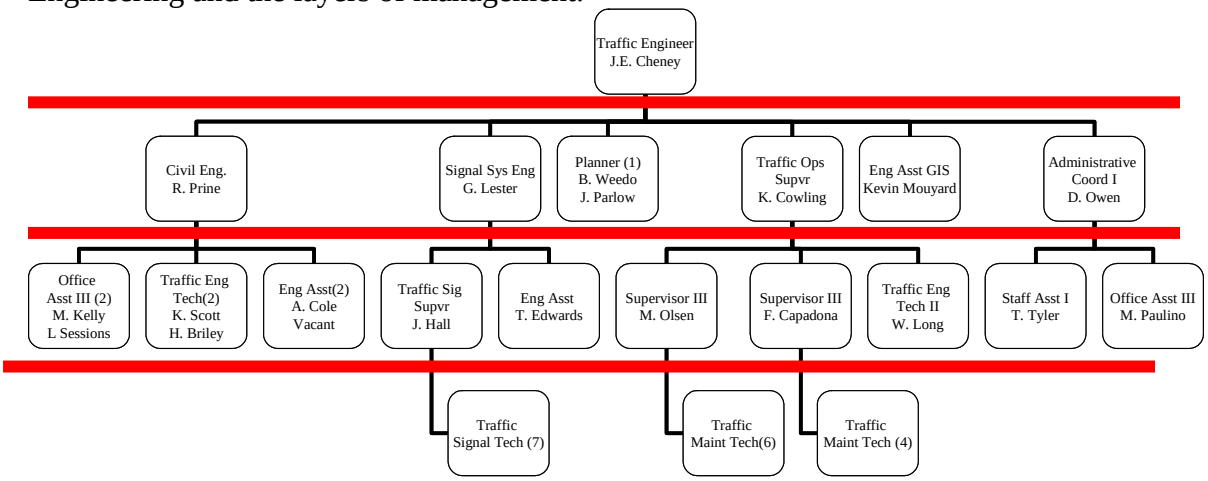

Figure 2-63- Traffic Engineering Organization

The span of control for the Traffic Engineering Layers is as follows:

- Traffic Engineer to Direct Reports - 1:6
- Engineer/Supervisor to Direct Reports – 1:1 to 1:6
- Traffic Signal Supervisor/Supervisor III to Direct Reports- 1:4 to 1:7

Water Resources and Utilities

The WRU director reports directly to the Public Works Director. The WRU division is divided into two sections including utility engineering/Water resources and operations. While all employees are under one division it was divided into two sections. Overall the WRU Division has 3 additional Layers of management. Figure 2-64 outlines the organization and layers of management for Utility Engineering/Water Resources and Figure 2-65 outline the organization and layers of management for Operations.

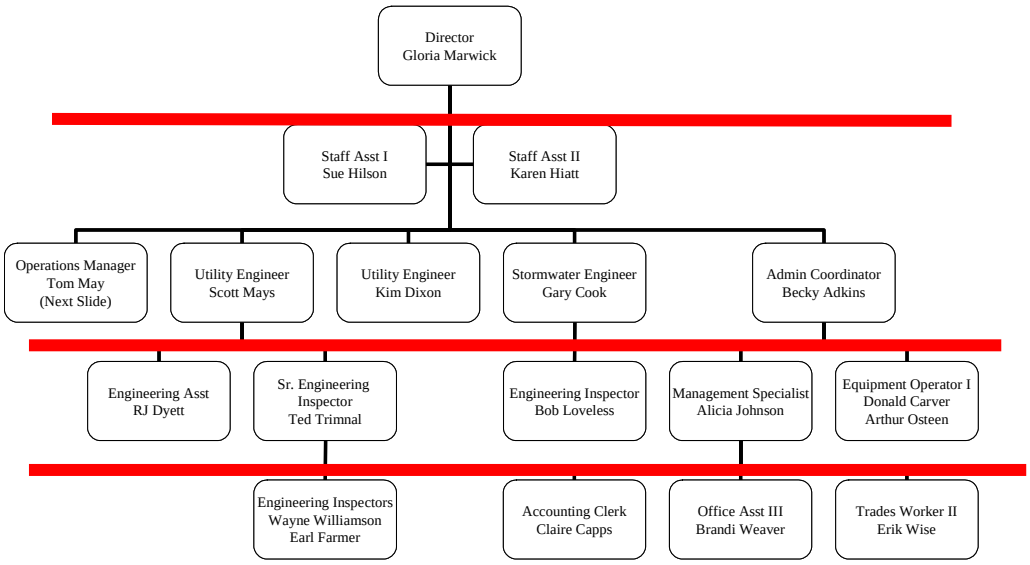

Figure 2-64 - Utility Engineering/Water Resources Organization

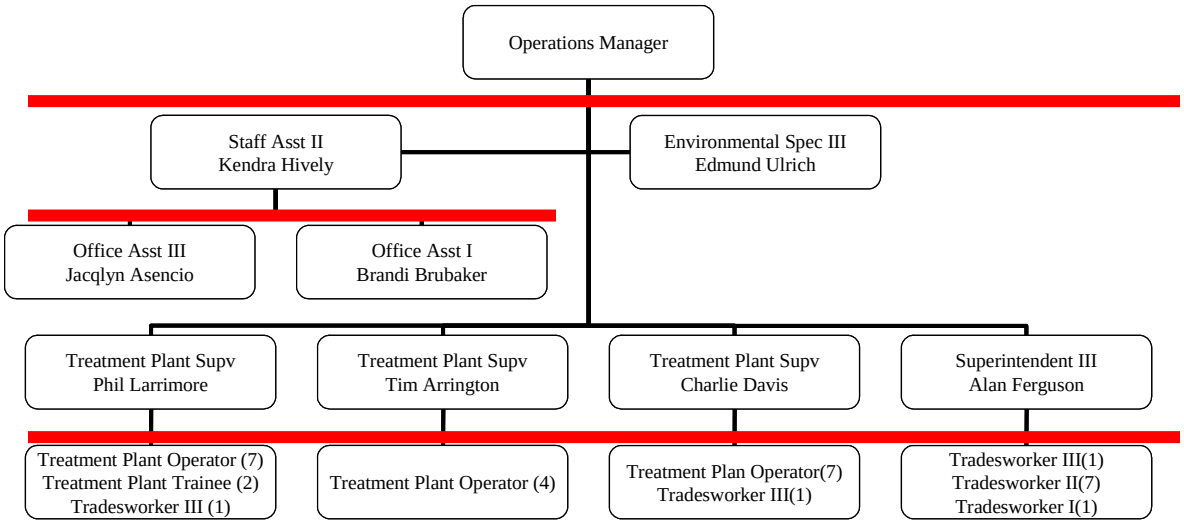

Figure 2-65 - Utility Operations Organization

The span of control for the 3 layers of the WRU division is as follows:

- Director to Manager or Engineer – 1:7
- Manager/Engineer to Direct Reports – 1:1 to 1:6
- Engineering Asst/Specialist/Supervisors to Direct Reports – 1:1 to 1:10

Solid Waste

The Solid Waste Director reports directly to the Public Works Director. The Solid Waste division has three additional layers of management. Figure 2-66 outlines the organization for Solid Waste and the layers of management.

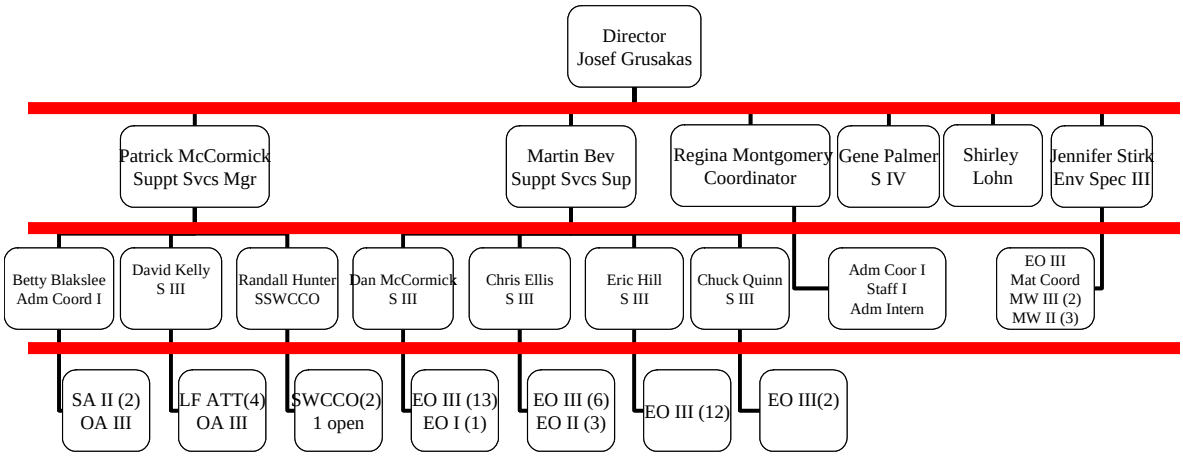

Figure 2-66 - Solid Waste Organization

The span of control for the 3 layers of the Solid Waste division is as follows:

- Director to Manager/Direct Report– 1:6
- Manager/Supervisor to Supervisor III/Direct Reports– 1:1 to 1:7
- Supervisors to Direct Reports– 1:2 to 1:14

Mosquito Control and Vegetation

The Mosquito Control Director reports directly to the Public Works Director. The Mosquito Control division has two additional layers of management. Figure 2-67 outlines the organization for Mosquito Control at the initial time of this report and outlines the layers of management. Mosquito Control reorganized their department during the review and changes have been to the organization since the gathering of initial information.

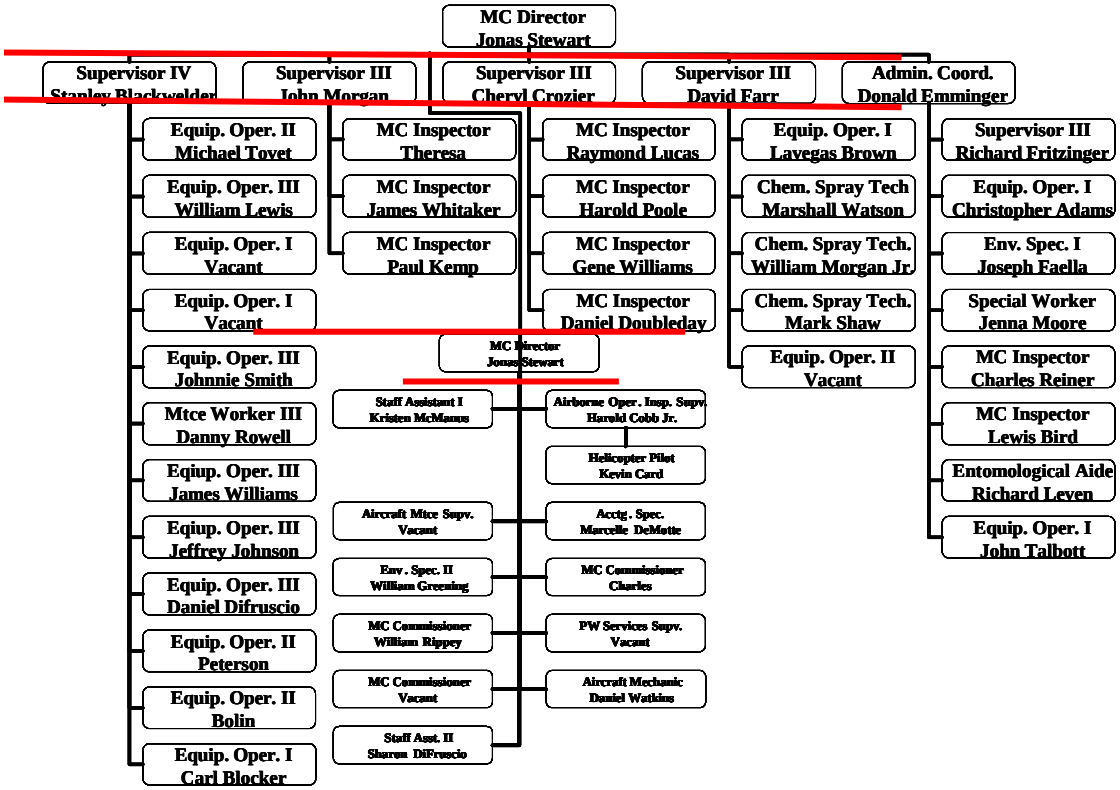

Figure 2-67 - Mosquito Control Organization

The span of control for the 2 layers of the Mosquito Control division is as follows:

- Director to Direct Reports - 1:15.
- Supervisor to Direct Report – 1:3 to 1:12

Construction Engineering

The County Engineer reports directly to the Public Works Director. The Construction Engineering division has three additional layers of management. Figure 2-68 outlines the organization and layers of management for construction engineering.

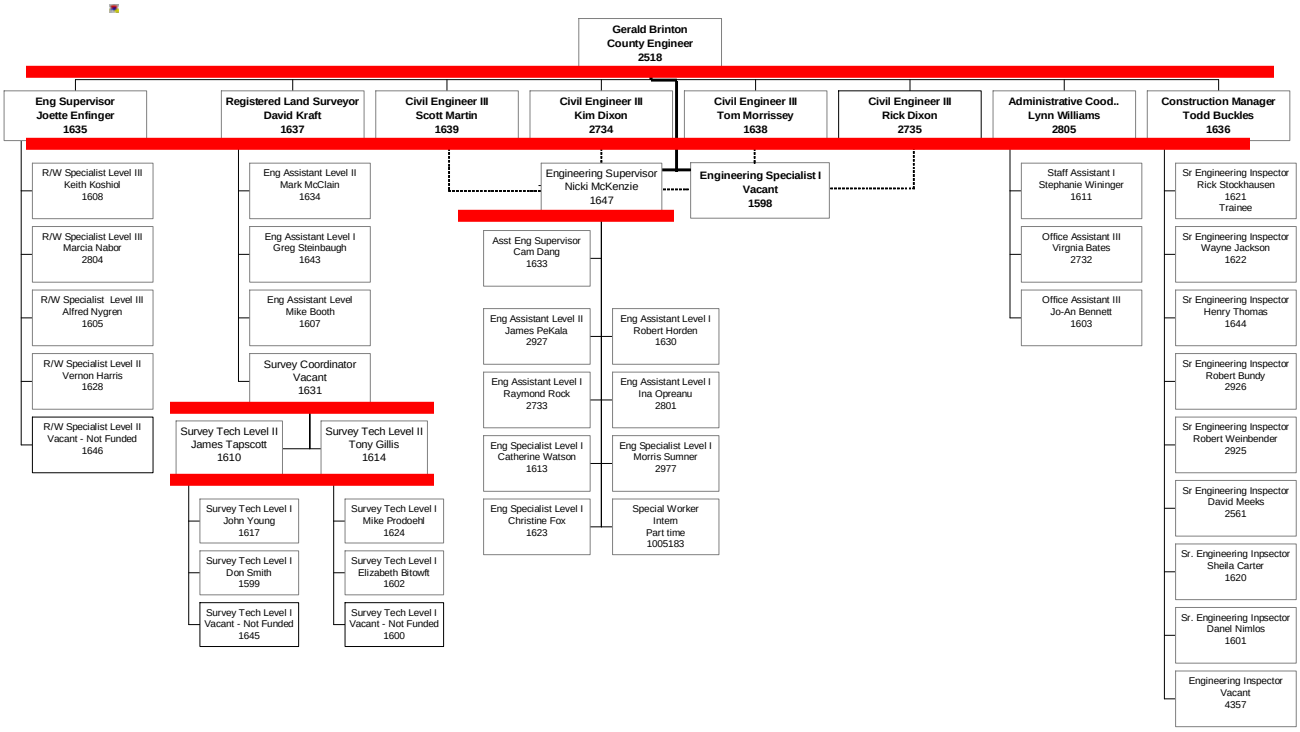

Figure 2-68 - Construction Engineering Organization

The span of control for the 3 layers of the Construction Engineering division is as follows:

- County Engineer to Engineering Supervisor/Engineer –1:8
- Supervisor/Engineer to Direct Reports – 1:1 to 1:9
- Survey Coordinator/Engineering Supervisor to Direct Reports – 1:2 to 1:9
- Survey Tech II to direct reports – 1:3

Construction Engineering Functions

Construction Managements main function is to complete the five year capital improvement plan. This is done by a series of groups that are divided up functionally within Construction Engineering: Right of Way, Survey, Project Management, Construction Management and Administration. Figure 2-69 provides a breakdown of how the groups are divided organizationally.

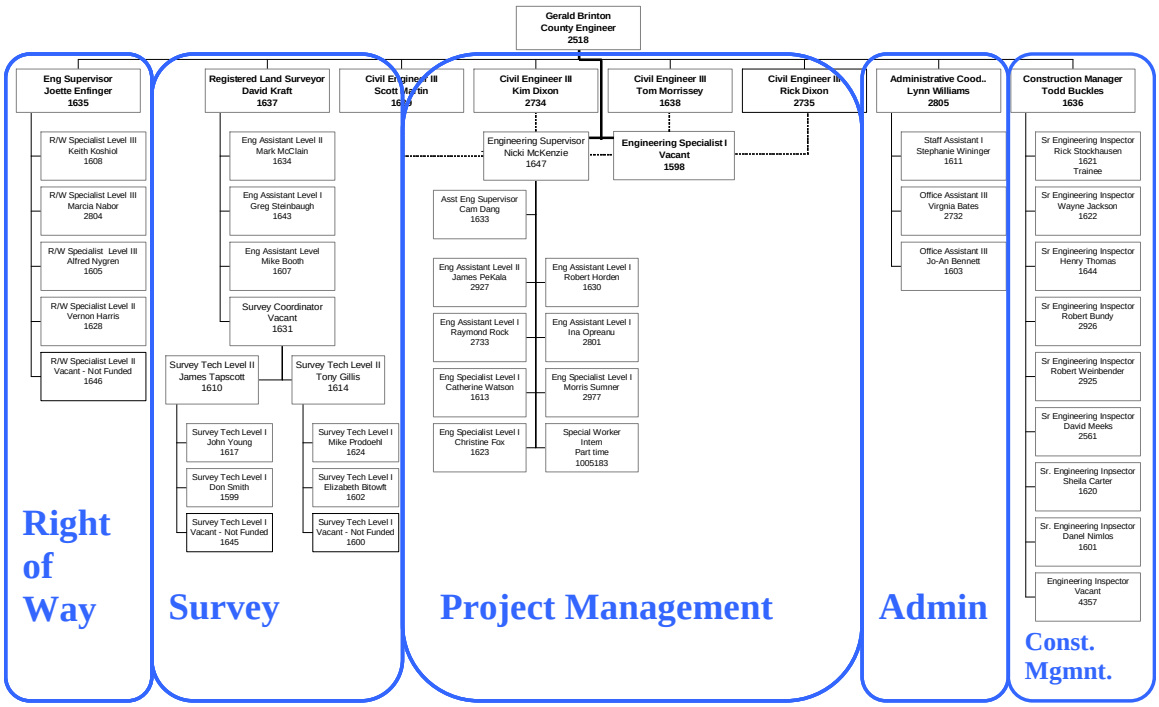

Figure 2-69 - Construction Engineering Functional Groups

Each of the groups within construction engineering serves specific functions that assist in the goal of developing the capital improvement plan. The group functions are as follows:

- Administration Functions – Provide administrative support; assist in CIP documentation, GIS support and financial reporting.
- Design and Project Management Functions – Manage and design projects in-house and by contract, coordinate permits, outline right of way needs, manage consultants, check plans, in-house design and management of in-house teams.
- Survey - Right of way mapping, manages right of way design, review of plans, prepare legal descriptions and perform surveys.
- Construction Management – Manages construction projects and road rehabilitation.
- Right of way – Provides cost estimates, manages right of way acquisition process, negotiates land, appraises land, provides public information and researches land ownership and property values.

Years with the County

The hire date of employees by classification for the Public Works Department was used to generate Figure 2-70 showing the average time with the County based upon employee classification. On average employees have eleven years with the County. There are several classifications that have over 25 years of experience including the supervisor III, support services manager, traffic signal supervisor, senior S/W compliance officer, the mosquito control director, engineering specialist, aircraft mechanic and airborne inspection supervisor classifications.

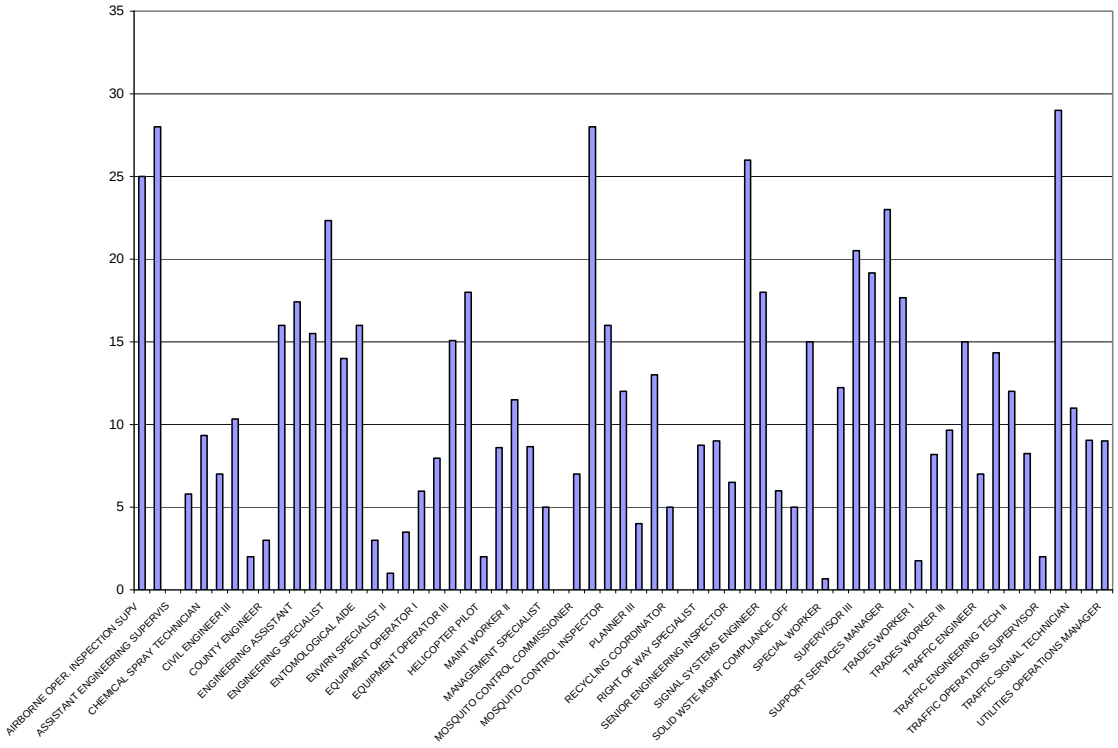

Figure 2-70 - Years of Employment with the County

Overtime

Information on the regular, leave and overtime data for the July 2003 through June 2004, July 2004 through June 2005 and July 2005 through June 2006 for the Public Works Department was analyzed. In 2003-2004 the County tracked 676,117 hours of regular time and 43,049 hours of overtime. In 2004-2005 the County tracked 738,116 hours of regular time and 84,066 hours of overtime and in 2005-2006 the County tracked 687,643 hours of regular time and 63,699 hours of overtime. Figure 2-72 shows the overtime as a percentage of regular time. As indicated in the chart in 2003-2004 there was a little over 6% of overtime. In 2004-2005 overtime hours increased dramatically to over 11% of regular time. This appears to have been during time of three hurricane occurrences, which resulted in increased overtime. In 2005-2006 the overtime reduced from the previous year to over 9%.

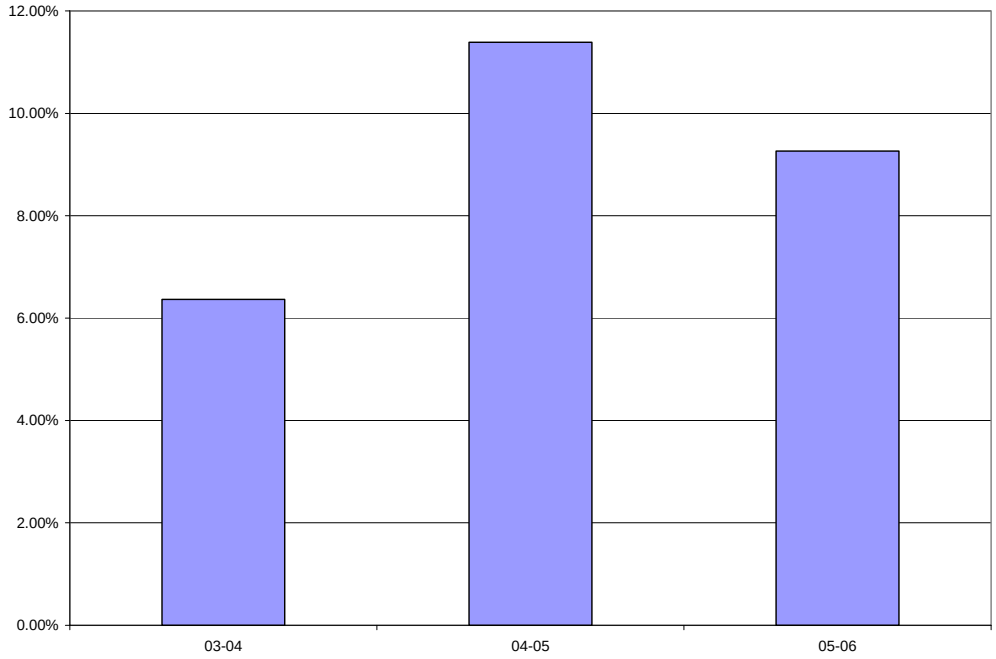

Figure 2-71 - Public Works Overtime by Year

Analysis of several years of data show that the least amount of overtime was used in 2003-2004 and the most overtime was used in 2004 to 2005. Figure 2-72 demonstrates the overtime for each division by year. The lines represent the overall agency overtime for the same time period. Road and Bridge and Solid Waste had overtime above the agency average for all three years of data. In 2005-2006 Solid Waste had 14% of overtime, road and bridges had 13%, followed by Traffic Engineering at 6%, then Water Resources and utilities at 5%, then Mosquito Control at 4% and Construction Engineering at 1%.

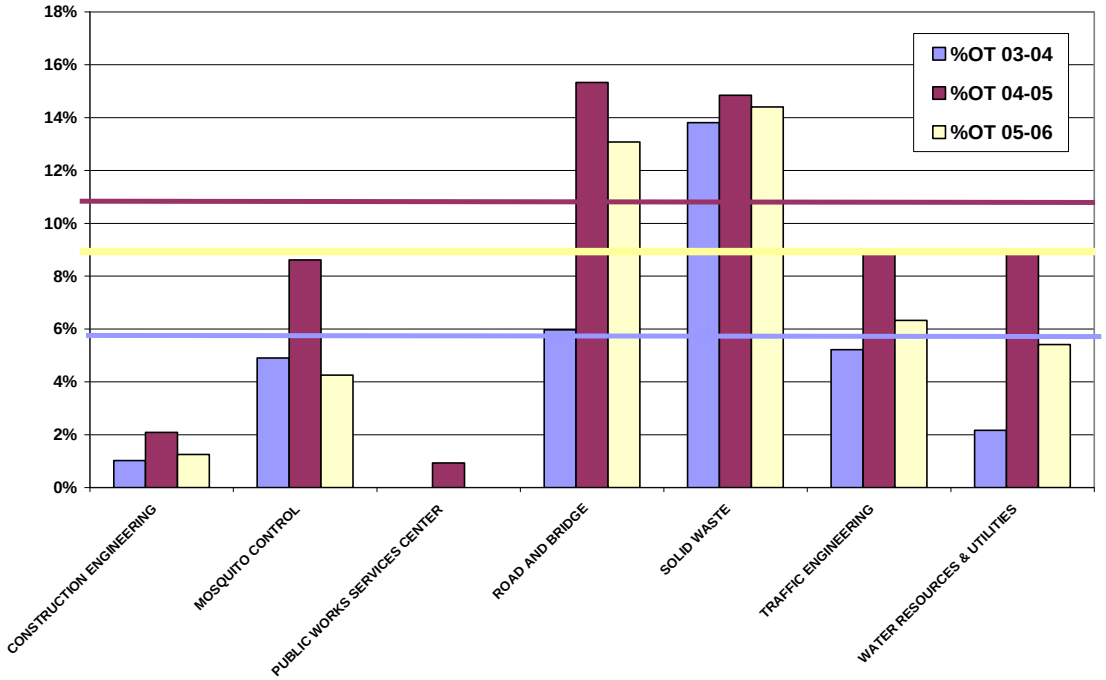

Figure 2-72 - Overtime by Division 2003-2006

Employee Certifications

In addition to training received by the County, many employees have and/or acquire specialized certifications. Both Water and Wastewater Operations within Water Resources and utilities have certified operators. There are 3 water treatment operators, 5 wastewater operators and 13 dual licensed operators for each function. There are also 2 trades workers certified in water distribution and 9 trades workers certified in collections. Solid Waste has many specialized functions that require training which are tracked and recorded in an MS Excel spreadsheet. After review of the MS Excel file, 39 specialized trainings were identified with some employees being trained on multiple functions. Training for Solid waste includes: Spotter, Land Fill Operator, MRF, Transfer Station, and C&D. Construction inspectors also have various MOT for stormwater, A/C, ACI, and FDOT Construction. Traffic Sign has 6 IMSA certifications between grades 1 and 3. Traffic Signal also has six IMSA certifications with a minimum of grade 2 level. Other certifications and specialized training may exist and vary by division.

Resources

The resources used by the Public Works Department are located throughout the 14 different staging sites. The County resources consist of labor, equipment and materials were reviewed. County Public Works staff work varied schedules depending on the division and crew. Generally, most crews work four days over a one-week period for 40 hours throughout the year with alternating Mondays and Fridays off (split 4@10). This allows for 5-day coverage of all maintenance activities. There are several exceptions to this work schedule. The Road and Bridge inmate crew works 5 days a week with County

staff on the split 4@10 schedule. Traffic Engineering and Mosquito Control works 5@8. The Utilities Division provides seven-days-a-week coverage for water and waste water treatment plants from 7:30am to 11:30pm. In general employees for Utilities work 5@8s with a few employees working 4@10s and one person at the southwest regional plant that works 10 days on and then 4 days off. Solid Waste generally works 4@10. Due to the hours of operation of the Tomoka Landfill and Transfer station, some employees work 3@11 with 1@7 schedules to provide coverage on the weekend.

A detailed listing of labor and equipment, including the number of units, was compiled from information provided by County staff and verified by LAC.

Labor

The Public Work Department has a total of 429 full time positions. In addition to the 429 positions the County utilizes temporary staff and inmates. The Public Works Department is made up of 7 separate divisions which include: Administration, Road and Bridges, Mosquito Control and Vegetation, Water and Utility Operations, Solid Waste, Construction Engineering and Traffic Engineering. Information is based upon a point in time basis as of October 1, 2006. New organizational structures and vacant positions may not be reflected after this point. Figure 2-73 indicates the number of employees by division. Figure 2-74 indicates the percentage of employees by division. Road and Bridges have the most employee of all divisions equaling 36% or 154 employees. Solid Waste employees make up the next highest total number of employees at 17% of the Public Works Department or 74 employees. Water and Utility Operations has 58 employees (14%), Mosquito Control and Vegetation have 50 employees (12%), Construction Engineering has 49 employees (11%) and the smallest group is administration which has 6 employees and is 1% of the total Public Works division.

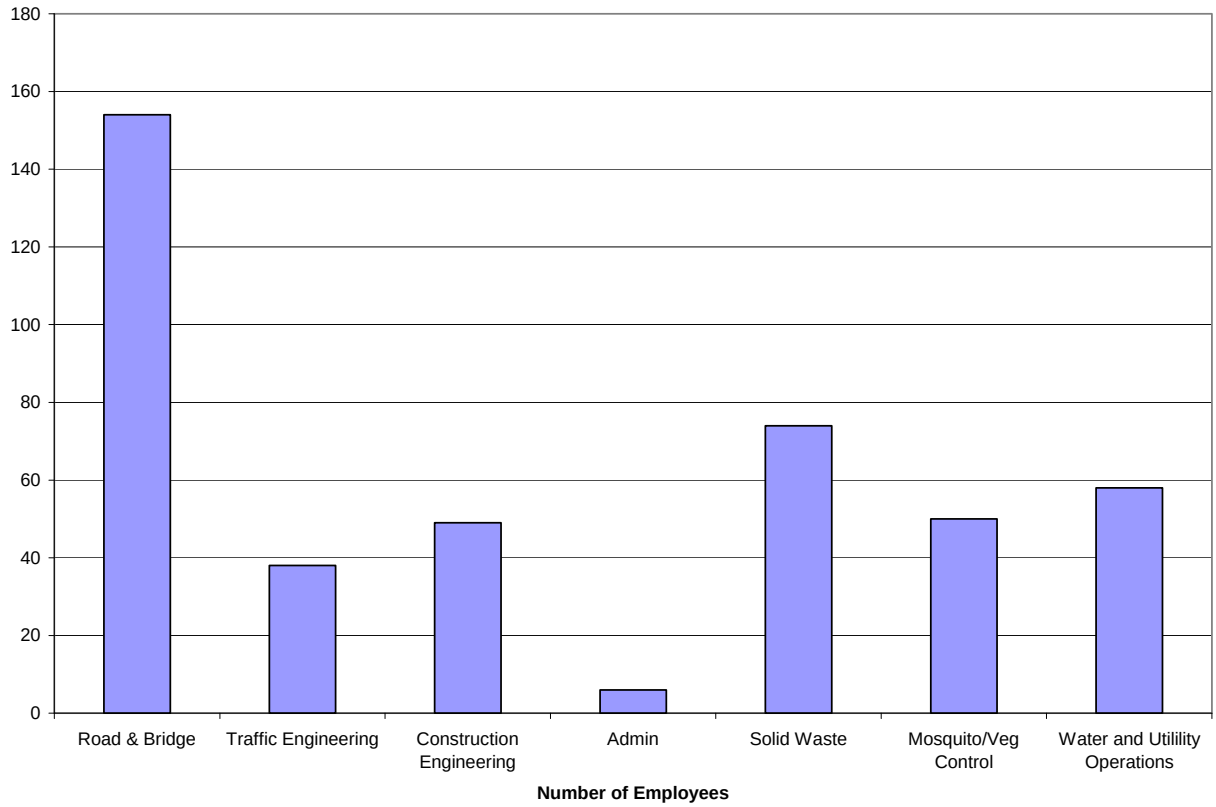

Figure 2-73 - Labor by Division

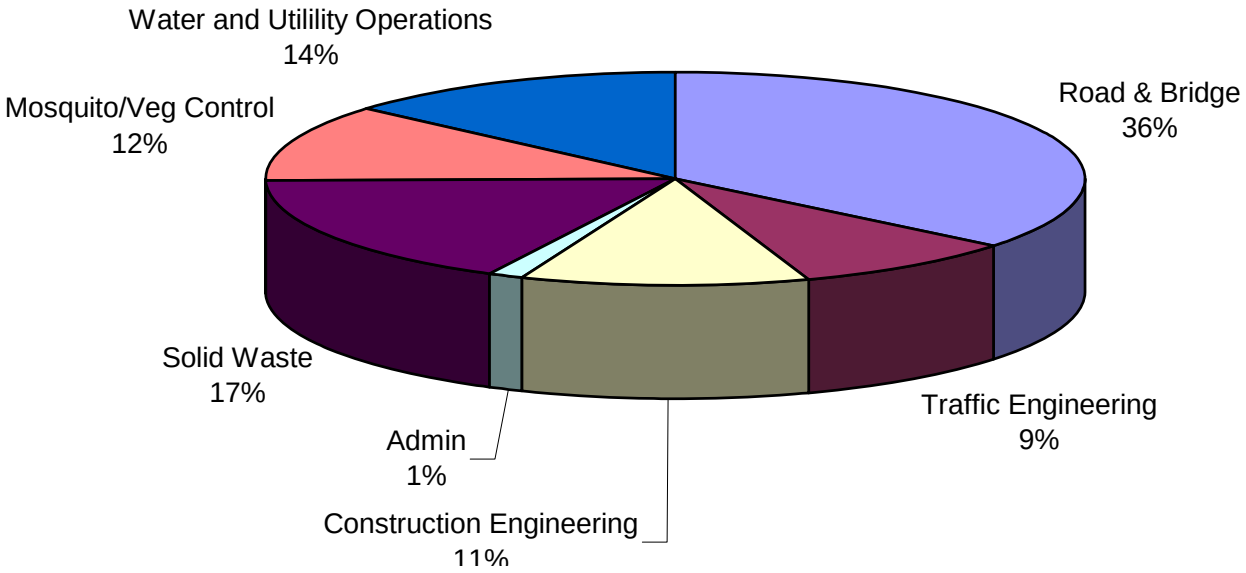

Figure 2-74 - Percentage of Labor by Division

Administration makes up the smallest percentage of all of the divisions in Public Works. This division oversees all other divisions. In addition administration provides assistance

and support to the other divisions through the fiscal resources manager, and two special project managers. All administrative employees report to the engineering office. Table 2-6 outlines the 6 administration employees by classification.

Table 2-6 - Administration Breakdown by Classification

Title	Admin
Admin Aide	1
Director of PW	1
Fiscal Resource Manager	1
GIS Specialist II	1
Operations Manager	1
Special Projects Manager	1
Grand Total	**6**

There are 154 employees in the Road and Bridge division with 90 of the 154 positions being in equipment operator I-III categories. Road and bridge employees are staged at 4 separate locations throughout the County including The Deland Yard, the Holly Hill Barn, the Osteen Barn and the New Smyrna Beach Barns. Table 2-7 outlines the Road and Bridge employees by classification.

Table 2-7 - Road and Bridge Employees by Classification

Title	R&B
Bridgetender	11
Bridgetender - Intermittent	4
DEL OA II	2
DEL PT	1
DEL SA II	2
Eng Asst	1
EO I	25
EO II	28
EO III	37
HH OA II	1
Interim Director	1
NSS OA II	1
PW Services Supervisor	1
S II	9
S III	13
S IV	4
Suppt Servs Mgr	1
Trades Sup	1
Tradesworker I	3
Tradesworker II	4
Tradesworker III	4
Grand Total	**154**

There are a total of 50 Mosquito Control Employees which stage out of two locations: New Smyrna Beach and Daytona Beach. Mosquito Control has many specialized classifications including the helicopter pilot and spray techs. Table 2-8 outlines the mosquito control and vegetation employees by classification

Table 2-8 - Mosquito Control and Vegetation Employees by Classification

Title	Mosq Ctrl
Accouting Spec	1
Admin Coord II	1
Airborne Ops Insp Sup	1
Aircraft Mech	1
Aircraft Mtce. Supervisor	1
Director	1
Entomological Aide	1
Env Spec I	1
Env Spec II	1
EO I	6
EO II	4
EO III	6
Helicopter Pilot	1
MC Commissioner	3
MC Insp	9
PW Services Supervisor	1
S III	4
S IV	1
SA I	1
SA II	1
Special Worker	1
Spray Tech	3
Grand Total	**50**

Traffic Engineering has 38 employees with one position which is shared for a total of 37 positions which report to three separate locations: the three reporting locations are the Engineering Office, Holly Hill and The Deland Yard. The planners, engineering assistant and civil engineer report directly to the engineering office, while all other employees work out of the Holly Hill Barn. Most of the employees are Traffic Maintenance Techs or Traffic Signal Techs. Table 2-9 outlines Traffic Engineering employees by classification.

Table 2-9 - Traffic Engineering Employees by Classification

Title	Traffic
Admin Coord I	1
Civil Eng III	1
Director	1
Eng Asst	3
Eng Asst - GIS	1
OA III	3
Planner III (Shared Position)	1
S III	2
SA I	1
Signal Sys Eng	1
Traffic Eng Tech I	2
Traffic Eng Tech II	1
Traffic Maint Tech I	2
Traffic Maint Tech II	3
Traffic Maint Tech III	2
Traffic Maint Tech Trainee	3
Traffic Ops Supervisor	1
Traffic Sig Supervisor	1
Traffic Signal Tech	1
Traffic Signal Tech II	3
Traffic Signal Tech III	3
Grand Total	**37**

Water and Utility Operations has 58 employees. In Table 2-10 employees have been divided into two separate groups and broken down by classification. The larger group is operations and has 40 employees which work out of various locations throughout the County. Utility Operations employees perform maintenance of pump stations, water and wastewater plants, sewer and water lines. Water and Utility Engineering is made up of 18 employees and consists of Utility administration, billing staff, and utility engineers and inspectors.

Table 2-10 -Water and Utility Operation Employees by Classification

Title	Util Ops	WR&Util	Grand Total
Eng Asst		1	1
EO I		2	2
Tradesworker I	1		1
Tradesworker II	8	1	9
Tradesworker III	2		2
Accounting Clerk		1	1
Admin Coordinator		1	1
Director of Water & Resource Util		1	1
Engineering Inspector		3	3
Env Spec III	1		1
Management Specialist		1	1
OA I	1		1
OA III	1	1	2
Operations Manager	1		1
SA I		1	1
SA II	1	1	2
Sr. Engineering Inspector		1	1
Stormwater Engineer		1	1
Superintendent III	1		1
Treatment Plant Operator	18		18
Treatment Plant Operator Trainee	2		2
Treatment Plant Sup	1		1
Treatment Plant Supervisor	2		2
Utility Eng		1	1
Utility Engineer		1	1
Grand Total	40	18	58

Solid Waste has 74 employees which stage out of two separate locations: the Tomoka Landfill and the Transfer stations. Solid Waste performs a variety of functions. These specialized require specific staff including, compliance officers, environmental specialist, landfill attendant and recycle coordinator. A complete list of employees by classification is outline in Table 2-11.

Table 2-11 - Solid Waste Employees by Classification

Title	Solid Waste
Adm Intern	1
Admin Coord I	2
Director	1
Env Spec III	1
EO II	5
EO III	34
LF ATT	4
Mat Coord	1
MW II	3
MW II - Landfill Attendant	1
MW III	2
OA III	2
OA IV	1
Recycle Coord	1
S III	4
S III - Enviro Tech	1
S III - Sr. Compliance Off	1
S IV	1
SA II	2
SSWCCO	1
Staff I	1
Suppt Servs Mgr	1
Suppt Servs Sup	1
SWCCO	2
Grand Total	**74**

Construction Engineering is made up of 49 employees. Employees are responsible for large project and purchasing right of way parcels. All construction engineering employees stage out of the engineering office. Table 2-12 outline the Construction Engineering employees by classification.

Table 2-12 - Construction Engineering Employees by Classification

Title	Construction
Admin Coord I	1
Asst Eng Sup	1
Civil Eng III	4
Const Mgr	1
Director	1
Eng Asst Level I	5
Eng Asst Level II	2
Eng Insp	1
Eng Spec Level I	4
Eng Sup	2
OA III	2
R/W Specialist Level II	2
R/W Specialist Level III	3
Registered Land Surveyor	1
SA I	1
Special Worker	1
Sr. Eng Insp	7
Sr. Eng Insp Trainee	1
Survey Coord	1
Survey Tech Level I	6
Survey Tech Level II	2
Grand Total	**49**

Inmate Crews

In addition to the employees outlined above, the Public Works Division utilizes inmates as a cost effective form of additional labor. At the time of this study inmates cost the County $12.03 per hour when accounting for support County labor and equipment.

Inmates are used to perform non-skilled labor intensive work which may include litter removal, vegetation control, mowing, cemetery maintenance, and sidewalk maintenance and are allowed to use small tools which include small chain saws, push mowers and concrete saws. Inmate Supervisors are trained through Department of Corrections. Inmates are picked up at the correctional facility with range of 4 to 9 inmates per crew.

Traffic Studies

Traffic Engineering performs studies both via the use of in-house staff and that of outside support. Four consultants are managed by engineering to perform traffic studies. Studies are also independently performed in-house for signal, marking and sign warrants. Counts

are conducted to monitor traffic movement and classification of data and a Trip generation evaluation was conducted.

Additional tasks performed by traffic engineering include monitoring accidents through the use of the "Crash" program database and coordination of legal documents for non-vehicular easement and MS Access. Finally, review of future development of traffic issues in various local and regional issues such as DRC, DRI, concurrency, EIR actions, etc.

Traffic Planners:

Two traffic planners which share one full-time position are working directly for the traffic manager in support of several long range and regional planning efforts for movement of people, vehicle and materials.
Among the efforts include:

- ✓ Manage & support regional coordination efforts for MPO, concurrence & DRI traffic processes for County
- ✓ Determine candidate Bike & Pedestrian projects for inclusion MPO plan
- ✓ Review & comment on Comprehensive plans for regional compliance and continuity for all cities
- ✓ Coordinates with Construction and systems Engineering on cost estimates for inclusion MPO plan
- ✓ Prepare planning grant application of transportation studies for future and multimodal efforts

These planners operate independently and autonomously from other Public Works operations yet to work with construction engineering project managers and Traffic manager to a minor extent.

Utility Engineers
Two engineers are responsibility for capital improvement projects for Water and Utility Operations. Coordination between the engineers is based upon dividing the County into two separate geographical areas. The engineers utilize contract engineers for all design and costing; reviewing of plans and administer design efforts. Both engineering manage both in-house CIP work and those done by developers in their specific area.

Staff coordination meeting is performed twice a month to monitor efforts. Projects in general are managed through MS Excel and MS Word documents.

Currently there is minimal use of GIS by the Utility engineers with recently the County has begun the process of transferring AutoCAD drawings into GIS. This will allow better documentation in GIS, ability to link data to graphical assets and allow for better system utilization for planning.

Drop Program

The County has many employees that are in the State Drop program. The Drop program is part of the State Mandate Retirement Program that allows employees to terminate employee and retire yet work for the County on an extended time up to five years. During this time period the employee receives their regular salary along with their retirement salary that is put into a special fund. Currently there are 27 employees who will be leaving the Department within the next 5 years, many of which are senior staff within the department. These positions often are the most heavily compensated in leave benefits. Table 2-13 shows the number of employees who will be retiring in the drop program by year and division.

Table 2-13 - Drop Program Participant by Year and Division

Division	2006	2007	2008	2009	2010	2011	Grand Total
Construction Engineering			1	1	1		3
Mosquito Veg	1	1		1	2	1	6
Road & Bridges		4	4	1	1	1	11
Solid Waste			1		2		3
Traffic						2	2
Utilities			1			1	2
Grand Total	1	5	7	3	6	5	27

Figure 2-75 demonstrates the number of employees retiring in the drop program by division. Road and Bridges have the greatest number of employees participating in the drop program with a total of 11 employees retiring prior to 2012. Mosquito Control/Vegetation has 6 employees, Construction Engineering 3 employees, Solid Waste 3 employees, and Traffic Engineering and Water and Utility Operation both had two employees currently participating in the drop program. Many of the drop program participants are key employees within these divisions including some division directors.

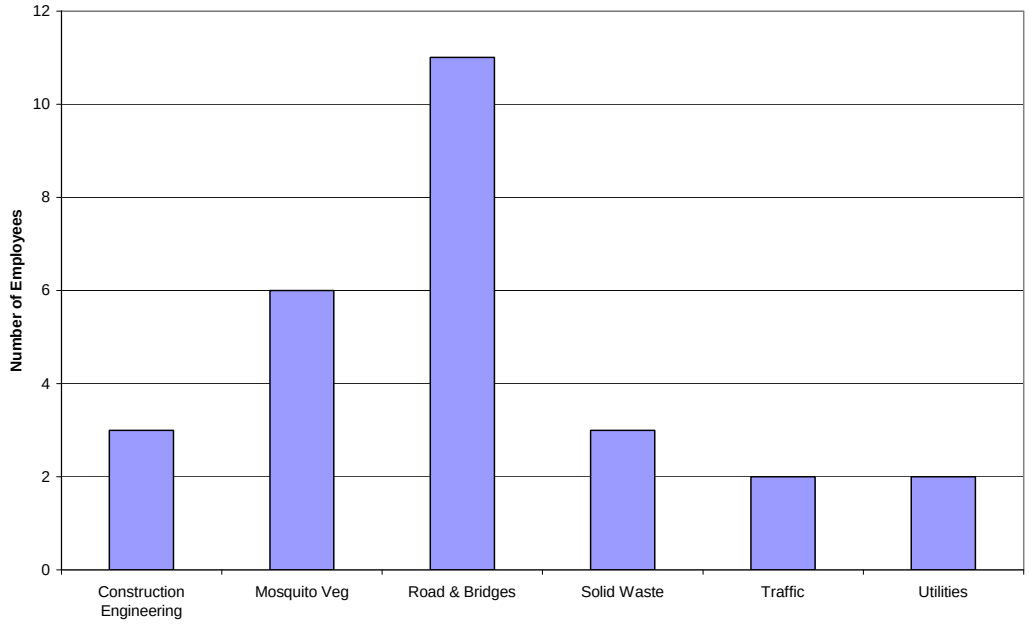

Figure 2-75 -Drop Program Participants by Division

Figure 2-76 demonstrates the number of employees retiring in the drop program by year through 2011. One employee will be retiring through the drop program in 2006, 5 employees in 2007, 7 employees in 2008, and 3 employees in 2009, 6 employees in 2010 and 5 employees in 2011. Many of these employees have been with the County for many years and have considerable institutional knowledge of the County's operations.

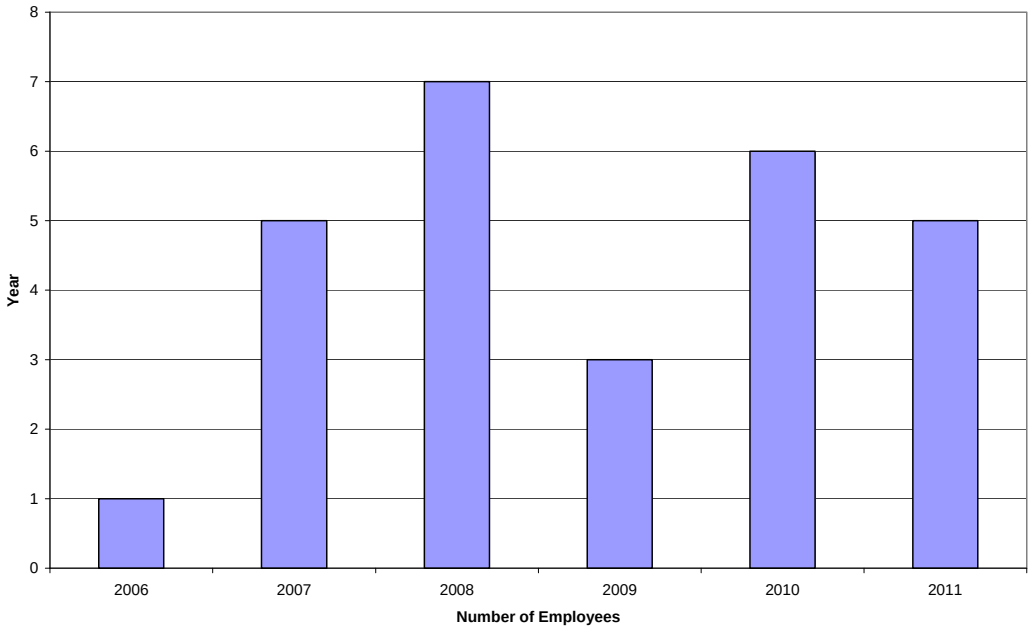

Figure 2-76 - Drop Program Participant by Year

Equipment Resources

There are 499 pieces of rolling stock and equipment assigned to the County's Public Works Department, including specialty equipment such as the two (2) helicopters and boats that are utilized for Mosquito Control. Figure 2-77 shows the total number of pieces of equipment by division excluding the two helicopters and non-rolling stock. Administration has 1 pieces of equipment, road and bridge has the most equipment (247 pieces) followed by Solid Waste (81), Mosquito Control/Vegetation (79 pieces), Water and Utility Operations (48 pieces), Traffic Engineering (26 pieces), and Construction Engineering (17). The equipment information, usage age and cost were determined utilizing the Fleet Department System with some utilization information from the TIS system. Further this data is a pint in time record of the County's vehicles at the time of the initial review and will not reflect new purchases or vehicles that have been salvaged. Further there may be some difference between the County's Fleet System Database and the individual spreadsheets in Public Works containing equipment information maintained by each division. Using the information from the Fleet System the summary information is compiled.

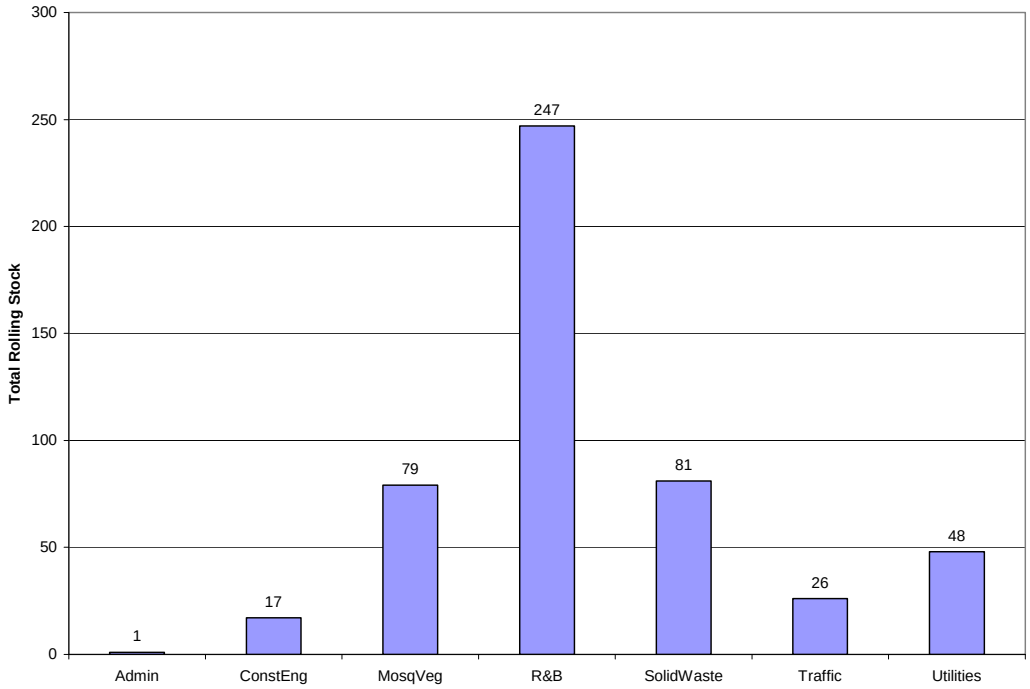

Figure 2-77 - Rolling Stock by Division

Figure 2-78 indicates the number of pieces of equipment by classification. The classification that comprises the most is pickups with 91 - ½ ton pickups which are 18% of the County's rolling stock.

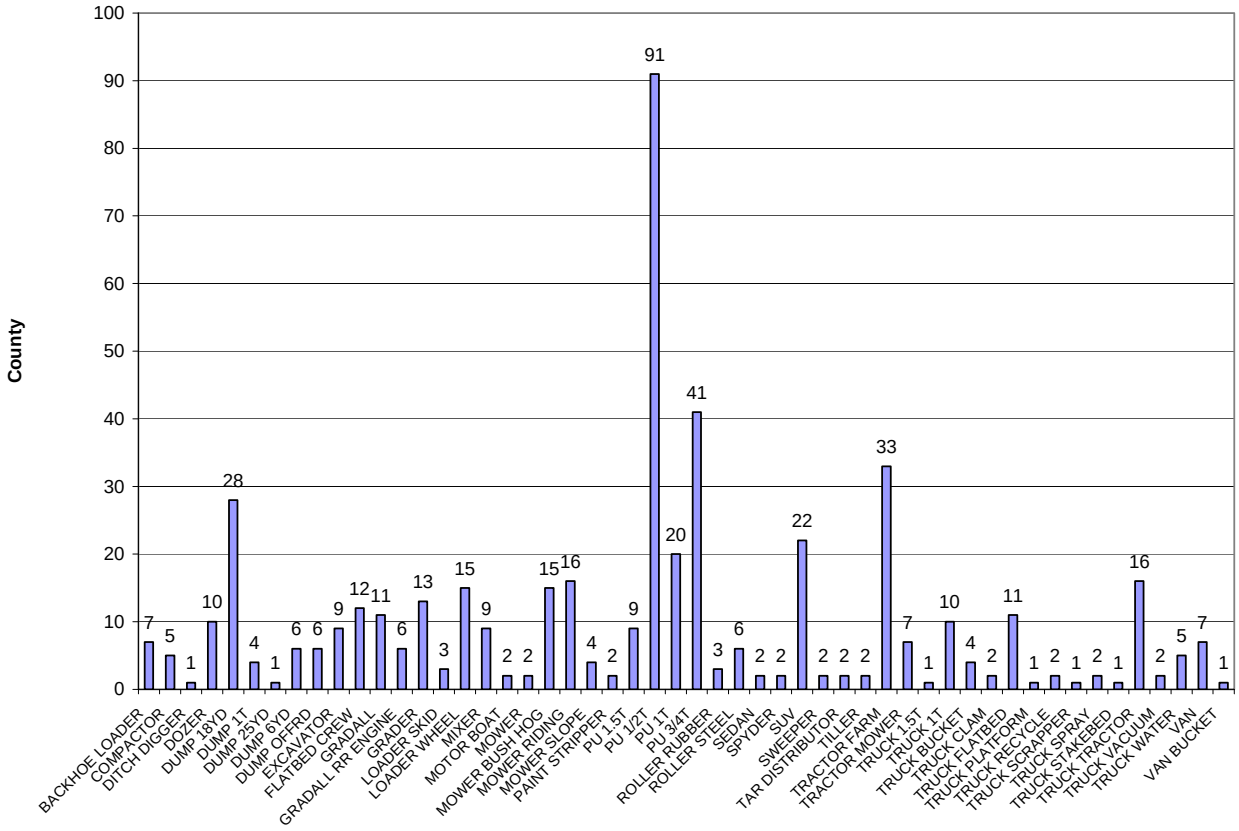

Figure 2-78 - Rolling Stock by Classification

Figure 2-79 indicates the average age of equipment by classification. The average age of all of the County's Non-rolling stock is 6 years. Heavy equipment in general had a higher average age then 6 as it is generally not leased. Leased vehicles are replaced after 6 year and are generally light equipment vehicles such as small or ½ ton pickups.

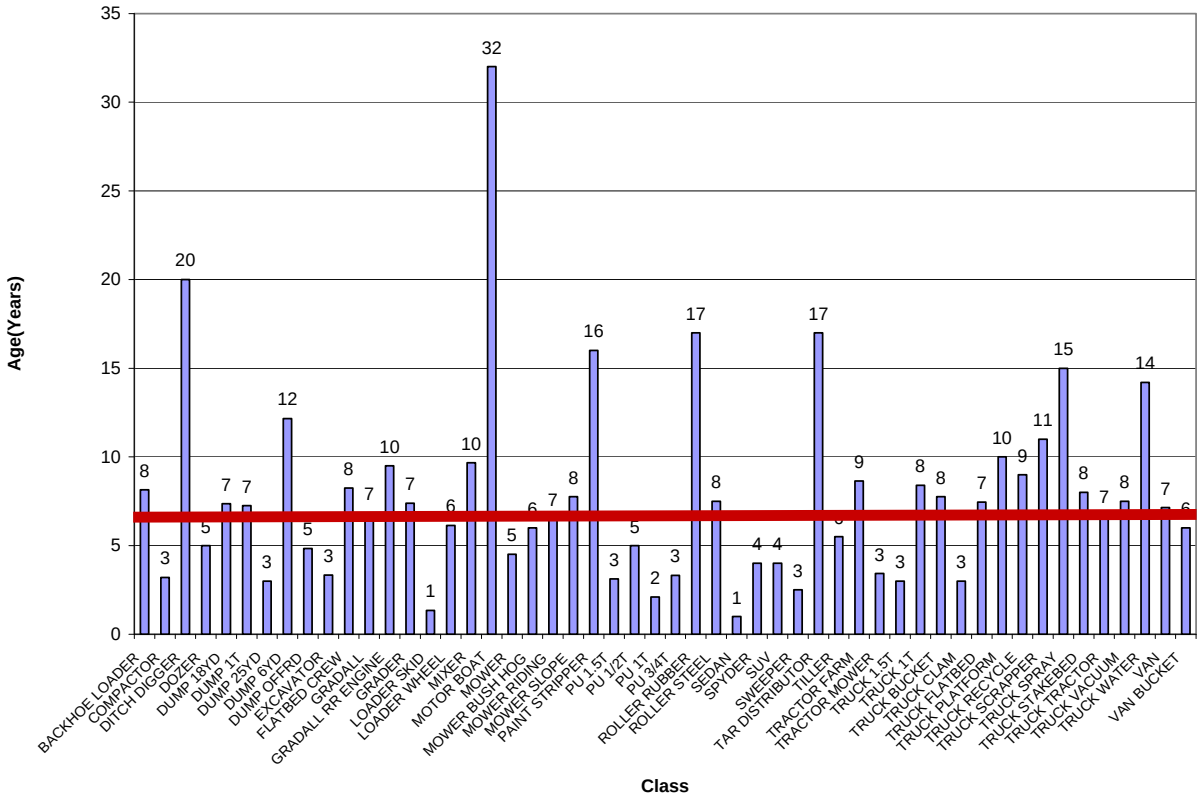

Figure 2-79 - Average Age by Classification

The County also has many non-rolling stock items which include trailers and attachments. There are 219 non-rolling stock items in Public Works. Road and Bridges has the greatest number of non-rolling stock items (80), followed by Solid Waste (71), Water and Utility Operations (37), Mosquito Control/Vegetation (19), Traffic Engineering (11) and Construction Engineering (1). The largest percentage of non-rolling stock is trailers. 45 of the 219 non-rolling stock or 20% is trailers. Figure 2-80 provides the number of non-rolling stock by classification.

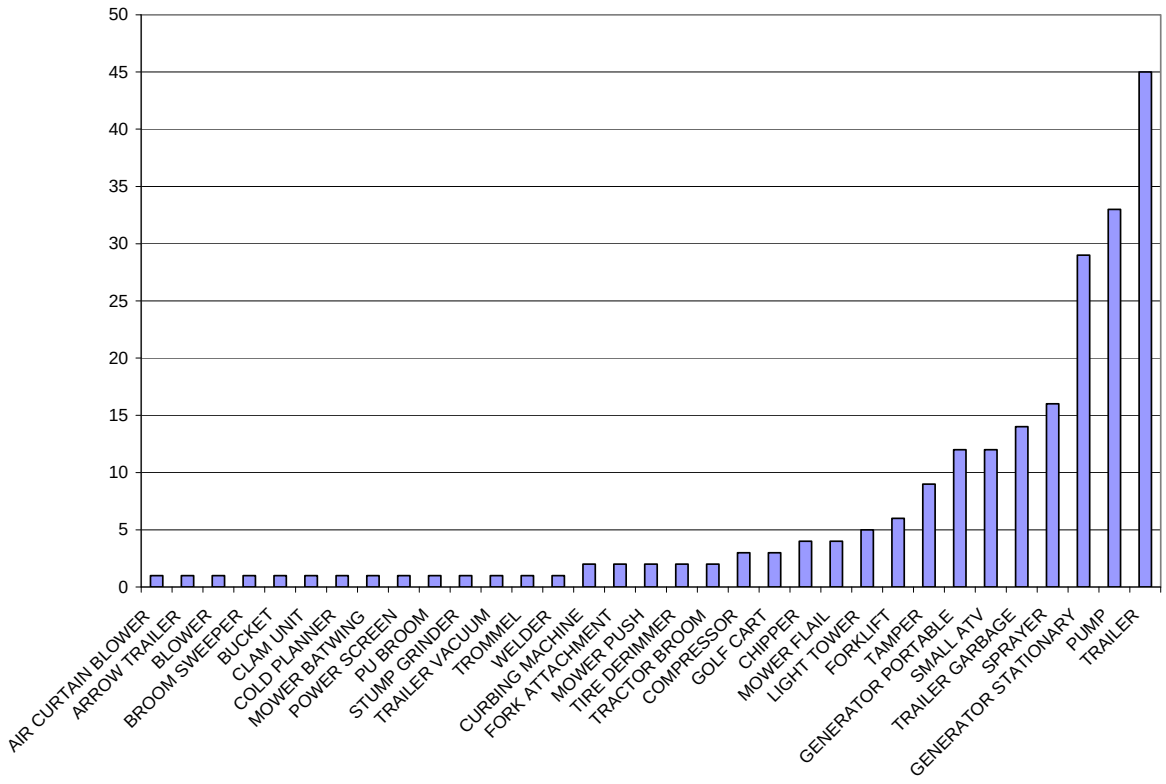

Figure 2-80- Non-Rolling Stock by Classification

Much of the Public Works Department's equipment is leased through the Fleet Division. The fleet division leased equipment for each division. In general leased equipment is replaced every 6 years. Figure 2-81 provides a breakdown of leased equipment versus equipment owned by a division. Approximately 29% of all Public Works Department equipment is leased. In general light equipment is leased and heavy equipment is owned by a specific division.

Figure 2-82 shows leased versus owned equipment by division. Traffic Engineering, Construction Engineering and Utility Engineering all lease more equipment than they own. This is due to their need for light trucks and smaller vehicles. Mosquito Control did not appear to lease any of its equipment.

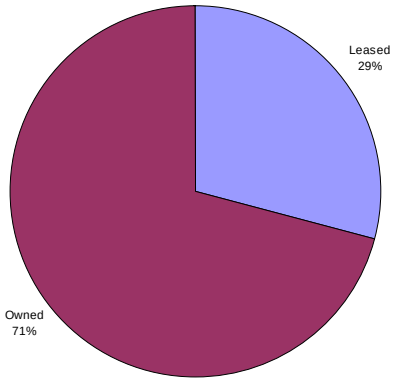

Figure 2-81 - Percentage of Rolling Stock which is leased

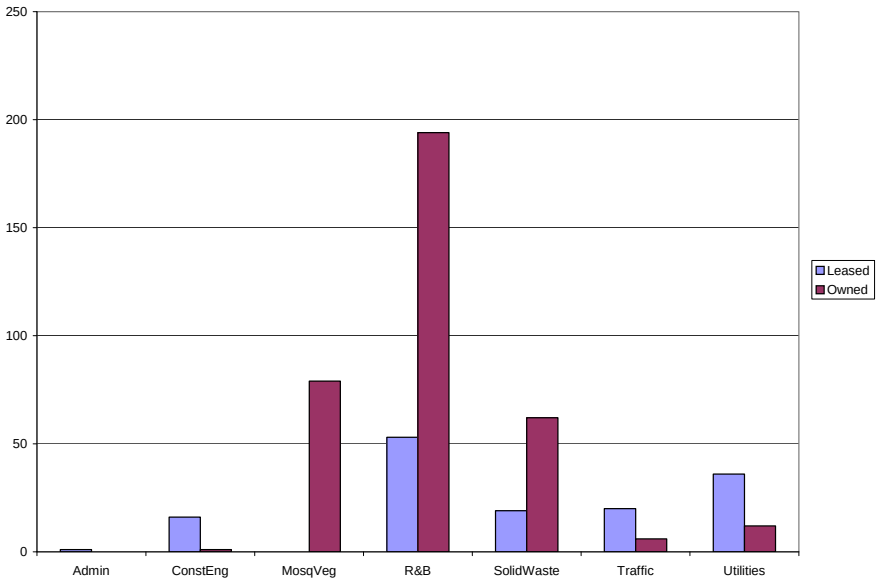

Figure 2-82 - Leased versus Owned by Division

Table 2-14 through Table 2-20 demonstrate the count, average age, average annual usage and meter type for each equipment classification by division. The average of usage was calculated by taking the total usage of the life of piece of equipment and dividing by the actual age of the equipment. An average was then calculated by class for each division. The meter type pertains to the usage of the vehicle and how it is tracked by the Fleet Division. An "M" indicates the equipment usage was tracked in miles and an "H" indicates a piece of equipment was tracked in hours.

Table 2-14 - Administrative Rolling Stock

Equipment Type	Count	Avg Age	Avg Usage	Meter Type
SUV	1	5	2451	M
Total Rolling Stock	**1**	5		

Table 2-15 - Road and Bridges Rolling Stock

Equipment Type	Count	Avg Age	Avg Usage Meter 1	Meter 1 Type
BACKHOE LOADER	6	8	253	H
COMPACTOR	1	1	77	H
DOZER	1	12	550	H
DUMP 18YD	21	7	1026	H
DUMP 1T	3	8	10347	M
DUMP 6YD	6	12	533	H
EXCAVATOR	1	2	725	H
FLATBED CREW	12	8	655	H
GRADALL	8	6	460	H
GRADALL RR ENGINE	4	10	570	H
GRADER	12	7	827	H
LOADER SKID	2	2	92	H
LOADER WHEEL	9	7	430	H
MIXER	9	10	99	H
MOWER	1	2	15	H
MOWER BUSH HOG	13	6	0	H
MOWER RIDING	13	6	107	H
MOWER SLOPE	4	8	496	H
PU 1.5T	3	2	15997	M
PU 1/2T	16	3	19043	M
PU 1T	14	2	12750	M
PU 3/4T	10	2	10717	M
ROLLER RUBBER	2	24	41	H
ROLLER STEEL	5	7	164	H
SPYDER	2	4	741	H
SUV	3	2	11800	M
SWEEPER	2	3	961	H
TAR DISTRIBUTOR	2	17	55	H
TILLER	1	7	125	H
TRACTOR FARM	24	7	268	H
TRACTOR MOWER	4	1	460	H
TRUCK 1T	4	8	10020	M
TRUCK BUCKET	3	6	1101	H
TRUCK CLAM	2	3	516	H
TRUCK FLATBED	11	7	561	H
TRUCK RECYCLE	1	6	807	H
TRUCK SCRAPPER	1	11	606	H
TRUCK TRACTOR	3	11	1202	H
TRUCK VACUUM	2	8	1434	H
TRUCK WATER	3	14	332	H
VAN	3	5	7276	M
Total Rolling Stock	**247**	**6**		

Table 2-16 - Traffic Engineering Rolling Stock

Equipment Type	Count	Avg Age	Avg Usage	Meter Type
MINIVAN	2	5	12,292	M
PAINT STRIPPER	2	16	5,715	H
PU 1.5T	6	4	15,015	M
PU 1/2T	1	4	15,411	M
PU 1T	1	6	23,879	M
PU 3/4T	7	2	14,469	M
SEDAN	2	1	11,058	M
TRUCK BUCKET	1	13	828	H
TRUCK PLATFORM	1	10	974	H
TRUCK STAKEBED	1	8	422	H
VAN	1	2	13,466	M
VAN BUCKET	1	6	19,130	M
Total Rolling Stock	**26**	**3**		

Table 2-17 - Water and Utility Operations Rolling Stock

Equipment Type	Count	Avg Age	Avg Usage	Meter Type
BACKHOE LOADER	1	12	199	H
DUMP 1T	1	4	7,957	M
EXCAVATOR	1	7	216	H
MOWER BUSH HOG	1	3	3	H
PU 1/2T	22	4	20,467	M
PU 1T	2	2	17,489	M
PU 3/4T	7	2	10,057	M
SUV	5	2	11,942	M
TRACTOR FARM	2	11	71	H
TRACTOR MOWER	2	8	397	H
TRUCK 1T	3	6	22,750	M
VAN	1	2	16,371	M
Total Rolling Stock	**48**	**4**		

Table 2-18 - Solid Waste Rolling Stock

Equipment Type	Count	Avg Age	Avg Usage Meter 1	Meter 1 Type
COMPACTOR	4	4	2176	H
DOZER	7	4	1074	H
DUMP 18YD	3	11	519	H
DUMP 25YD	1	3	2289	H
DUMP OFFRD	6	5	1153	H
EXCAVATOR	3	4	861	H
GRADER	1	9	868	H
LOADER SKID	1	1	234	H
LOADER WHEEL	6	5	1368	H
MOWER	1	7	2	H
MOWER BUSH HOG	1	5	2	H
MOWER RIDING	3	10	82	H
PU 1/2T	6	4	15125	M
PU 1T	2	1	14546	M
PU 3/4T	7	3	10727	M
ROLLER RUBBER	1	4	161	H
ROLLER STEEL	1	10		
SUV	4	5	14705	M
TRACTOR BROOM	1	9	69	H
TRACTOR FARM	4	8	258	H
TRACTOR MOWER	1	6	222	H
TRUCK 1T	1	6	28667	M
TRUCK RECYCLE	1	12	460	H
TRUCK TRACTOR	12	4	41708	M
TRUCK WATER	1	6	643	H
VAN	2	16	7021	M
Total Rolling Stock	**81**	**5**		

Table 2-19 - Construction Engineering Rolling Stock

Equipment Type	Count	Avg Age	Avg Usage	Meter Type
PU 1/2T	10	3	13083	M
SUV	7	5	11641	M
Total Rolling Stock	**17**	**4**		

Table 2-20 - Mosquito Control and Vegetation Rolling Stock

Equipment Type	Count	Avg Age	Avg Usage Meter 1	Meter 1 Type	Avg Usage Meter 2	Meter 2 Type
DITCH DIGGER	1	20	66	H		
DOZER	2	5	354	H		
DUMP 18YD	4	5	737	H		
EXCAVATOR	4	2	690	H		
GRADALL	3	9	154	H		
GRADALL RR ENGINE	2	9	527	H		
MOTOR BOAT	2	32	7	H		
PU 1/2T	36	8	6740	M		
PU 1T	1	2	5333	M		
PU 3/4T	10	7	10893	M		
SMALL ATV	1	16				
SUV	2	7	7933	M		
TILLER	1	4	98	H		
TRACTOR FARM	3	20	137	H		
TRUCK 1.5T	1	3	4667	M		
TRUCK 1T	2	15	4044	M		
TRUCK SPRAY	2	15	138	H	8034	M
TRUCK TRACTOR	1	21	92	H		
TRUCK WATER	1	24	697	H		
Total Rolling Stock	**79**	**9**				

In addition to the rolling stock described above, Mosquito Control has two helicopters: a 056 and 10B. The helicopters are owned and maintained by Mosquito Control and a flight log is kept indicating the number of hours each helicopter flies and the type of activity the helicopter was performing. Figure 2-83 demonstrates the flight hours by aircraft between May 2005 and April 2006. During this time period an individual aircraft in general did not exceed 15 hours of flight time per month. August of 2006 experienced the highest number of hours with a total of 53 hours of combined flight time. Figure 2-84 demonstrates the combined flight hours for both aircraft from February 2004 through June 2006. It appears in 2004 there were several months where there are no flight hours. The County has indicated during these months the only month when there are no flight hours is April 2004. Information is based flight logs received from the County and may be incomplete. In 2005 and 2006 it appears the aircrafts are used monthly.

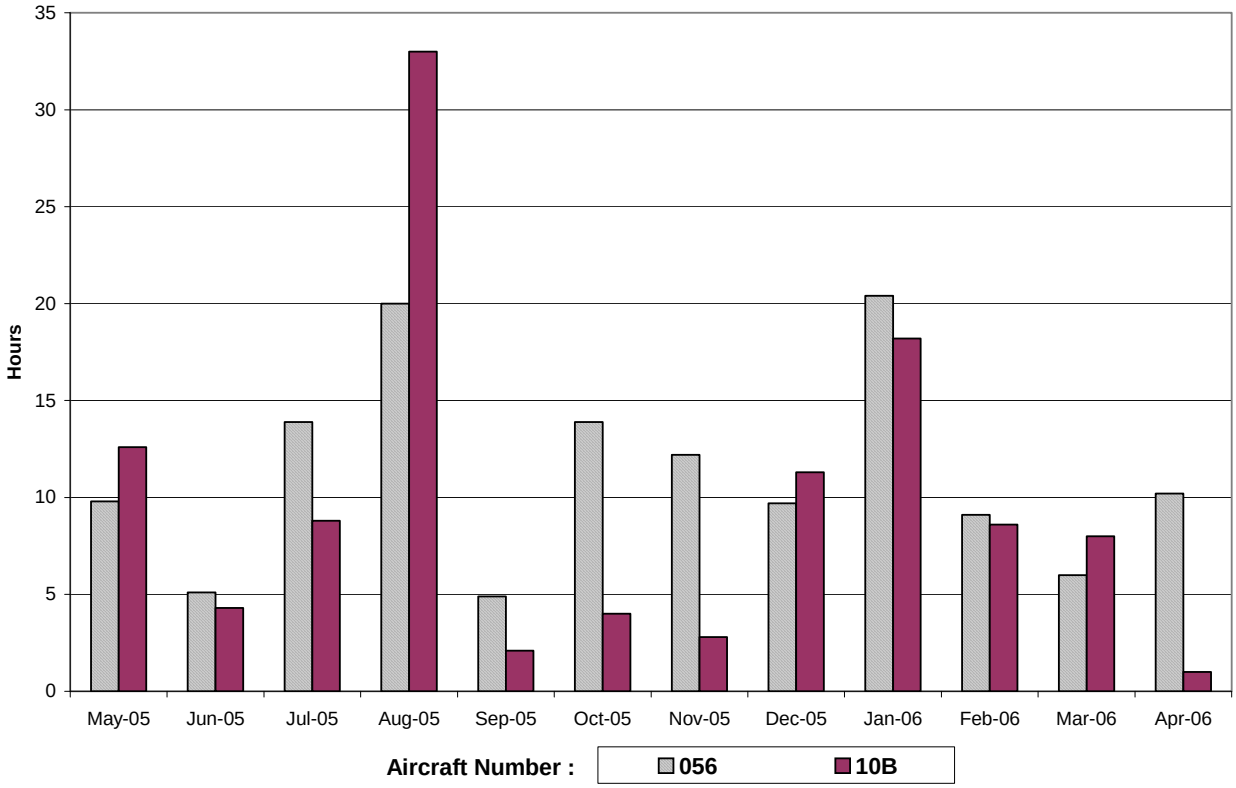

Figure 2-83 - Flight Hours by Aircraft

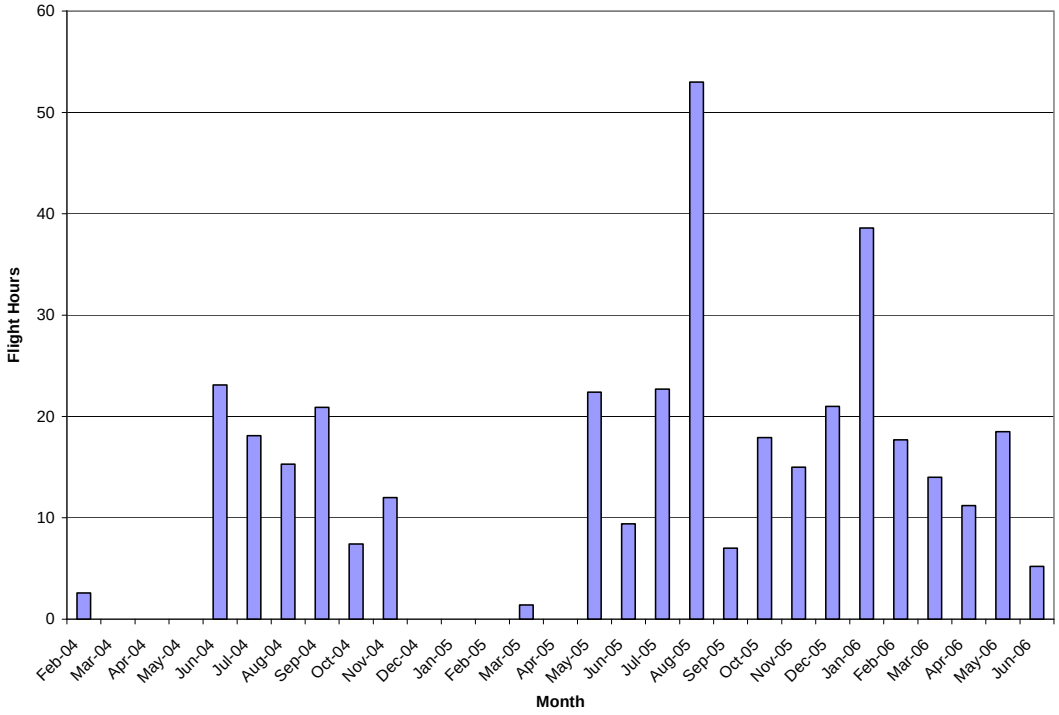

Figure 2-84 - Flight hours by Month

Mosquito Control tracks flight hours by general type. LAC reviewed data for a one year period from July 2005 through July 2006. There were 374 hours of flight time during this period. The largest amount of time (26%) was spent on administrative items, followed by inspection (26%), then larvacide (25%) and the lowest number of hours was spent on adulticide (23%). In general the helicopters spent a relatively similar amount of flight hours between all four activity times. Figure 2-85 demonstrates the flight hours by activity type. Administration flight hours include hours for other and hours conducting herbicide spray operations.

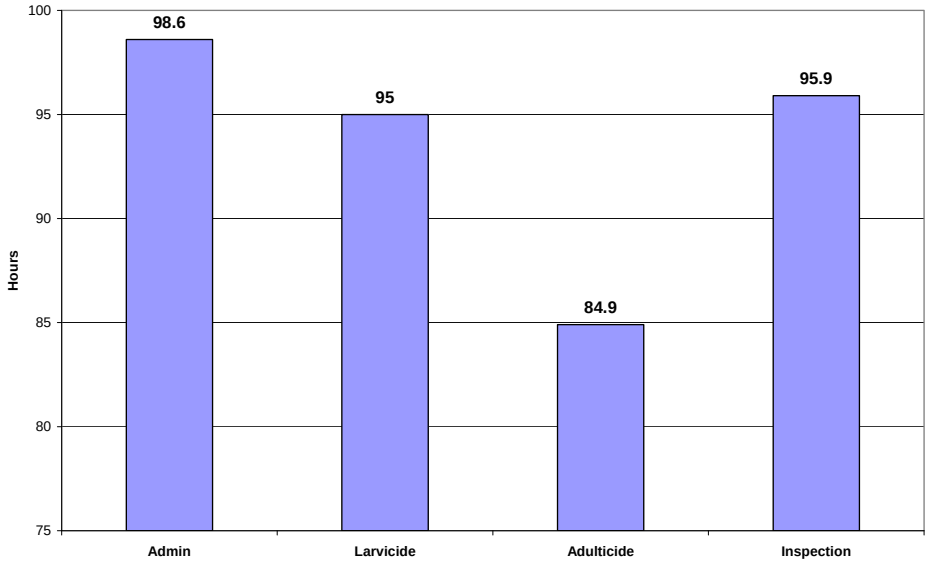

Figure 2-85 - Flight Hours by Activity (June-July 2006)

Equipment Rates

Equipment Rates utilized by divisions for work tracking varies. None of the rates used are calculated using actual maintenance cost and depreciation costs. In most cases rates that are utilized are based upon industry standards. Mosquito Control and Traffic Engineering use industry rates in their system for costing. Road and Bridge has rates in TIS but they have not been updated in 3 to 5 years and Water and Utility operations tracks labor to a work order but not equipment.

Fleet Division and Maintenance

The Fleet Division is responsible for maintenance of vehicles for the Public Works Department. While the Fleet division is responsible for maintenance, there is no central management of fleet replacement. Fleet replacement and ownership is determined by each specific division and managed through a separate fleet budget within each division. Leased equipment is managed through the Fleet division and is replaced on a 6 year cycle. The Fleet division has recently started working with Road and Bridges and Solid Waste to perform life cycle costing for equipment. Life cycle costing can be useful in determining the life of a vehicle.

The Fleet division has established specific equipment PM by type and interval for equipment. The equipment PMs are as follows:

- Heavy/Diesel Equipment
  - A – 200 Hours
  - B- 1,000 Hours
- Light Equipment
  - A – 5,000 Miles
  - B – 15,000 Miles
  - C – 30,000 Miles
- Generator Pumps
  - Inspected twice per year
  - PM every 150 Hours

While each division manages its own equipment and replacement budget, the Fleet division charges each division for work performed. The current average rate per hour charged is $49 with an expected increase to $55 in the upcoming year with a 14% markup on parts. While the current Faster Fleet system tracks hours worked on each piece of equipment along with parts and material, each division is only charged once a year for labor and parts prior to the beginning of the fiscal year. The amount charged is based upon last year's hours and cost tracked with possible equipment purchases for the next year estimated.

Contract Work

The County also uses contract support to perform many activities. Major maintenance services contracts used by the County include rehabilitation of dirt roads, flat and slope mowing, resurfacing, meter reading and trash collection and recycling. Dirt road rehabilitation is done by a combination of County and in-house support. The County prepares the road and the Contractor lays the asphalt and performs paving tasks. Meter reading is contracted out at $.68 per read and is performed by two contract meter readers.

The decision for use of these contractors is made on a case-by-case basis by management and is normally the result of the County's requirement for specific skills and/or proceeding by the lack of resources.

Work is also performed by Public Works for other agencies and is billed externally. The divisions utilize the external overhead rate and material markup specific to each division and bill on a time and material basis. The hourly rates are established by the fiscal division, the material rates are based on actual with the fiscal mark-up and the equipment rates vary by division and in some cases such as Water Resources and Utilities is not billed or tracked.

Figure 2-86 provides a breakdown of revenue from contract cities based upon information provided by the fiscal resource manager for mosquito control, road and bridges and traffic engineering between FY2003 and FY 2005. Road and Bridges performed $1.75 million dollars of reimbursable work for contract cities, mosquito control $279,000 and traffic engineering $152,000. Information in the Mosquito control budget indicates the actual

revenue from all contracts is ~ $693,000 which equates to 48% of mosquito control's operational budget.

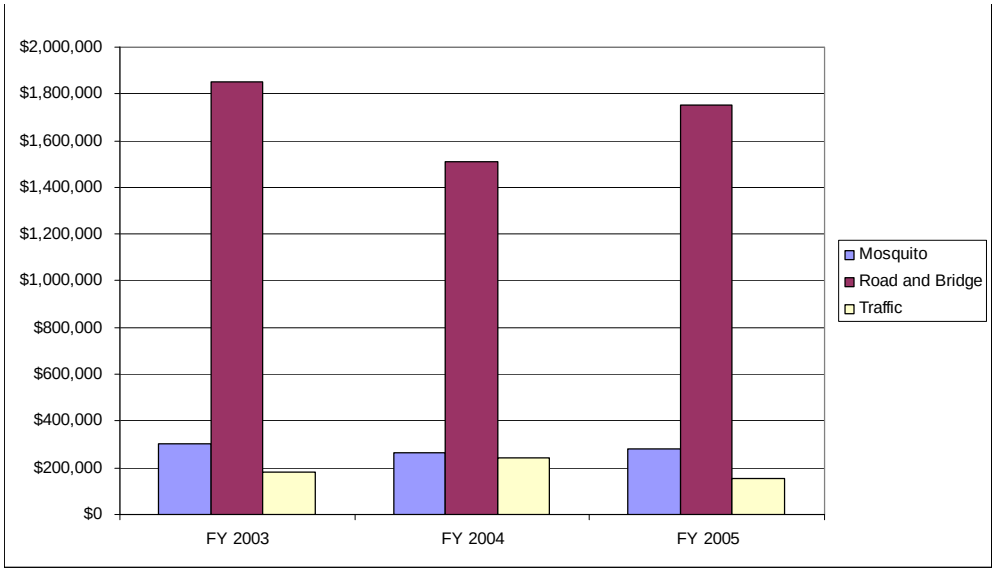

Figure 2- 86 - Contract City Revenue by Division

Traffic Operations has contracts with all cities within the County except for Daytona Beach and Deltona to perform traffic signal maintenance and operations support. In the case of the City of DeBary the County has a contract not to exceed $74,000 for the year. The contract identifies general tasks and amounts the County will perform including MOT plans, traffic impact analysis studies, traffic counts, signing, striping and signals. There are a few specific performance measured tasks identified such as re-stripe 10 roads every 3 years with 4 roads to be re-striped in FY06-07. The County Bills the City of DeBary on a time and material basis monthly with a summary and detailed report providing an explanation of the work performed.

Road and Bridges performs extensive work with the City of DeBary and Deltona, Mosquito Control performs work for the Cities in the west and unincorporated County and Water Resources and Utilities provides collection and distribution work for the City of DeBary and Deltona as well.

Work Scheduling, Routines and Identification

Work Identification

Work is identified by several methods within each division. In general there are five main areas function that assist in work identification. These include response work, inspection, preventative maintenance, routines and observation by staff in the field. Further the capital projects that are planned through engineering with input from various sources.

Response work is work that is identified by customer or citizens calling or emergency events that occur for which the County must react. The County has a service request

process in place for each division and documents response work. These processes have been outlined further in the work request section of the baseline.

Inspection work is work that is identified by County personnel who is sent out specifically to identify if work needs to be performed or to validate that work has been performed properly. Construction Engineering inspects construction plans, road and bridge performs site inspections, mosquito control inspects areas for larvae or if they are in need of spraying, Water Resources and Utilities utilize CCTV technology in sewer lines and Solid Waste has spotters to inspect trucks for material types.

Preventative maintenance is general maintenance that is usually performed to prevent larger more costly and serious maintenance issues from resulting in the future. Routine maintenance is work that is performed on a specific cycle or schedule. Preventative maintenance may often be performed on a routine. Most of the PM work the County is performing is also routine maintenance. Routine activities include grading which is performed every two weeks, mowing and hand clean ditches. Operators within water resources and utilities also perform routine plant maintenance and testing. Other routine or preventative tasks include signal PMs which are performed every 6 months, the desire to spray all locations once per year, striping every 2 years, tree trimming cycle every 4 years. Further, work performed for the Dirt Road program is identified 5 years in advance allowing a similar scheduled to a routine or preventative maintenance task.

Work that is identified by field staff is work that is observed as needed to be performed while working in the field and is documented so crews can return and repair the situation later. It is common for work to be identified in the field and a service request be developed. If the work is an emergency it will be repaired immediately.

Work Scheduling

Once work is identified, it must be scheduled. Work scheduling varies for each division and has been outlined below.

- Road and Bridges – Road and bridges have some routines but work is scheduled with maintenance staff daily. Each morning supervisors meet with their crews and provide assignments. In the case of large projects or tree trimming, scheduling will be performed at the supervisor's weekly meetings to allow for better coordination.
- Mosquito Control – At Mosquito Control, work is assigned by function or supervisor. The herbicide application and heavy equipment ditching cleaning tasks go to the appropriate supervisor and the remaining work is assigned by supervisors with specific inspectors being responsible for their zones. Inspectors then perform work as needed in their zones.
- Solid Waste – Scheduling varies by supervisor in Solid Waste. In general supervisors meet with staff at 7:15 for daily assignments. A weekly schedule is also developed to ensure coverage of the landfill and transfer station.
- Traffic Engineering – Traffic Engineering varies by maintenance function. Traffic Signs develops a weekly schedule with a zone rack assignment. This allows crews to go to their zone/rack assignment and pick up the signs they need and begin to

perform work. Sign workers will check each morning prior to leaving the yard to ensure schedule has not changed due to response work. Traffic signals assign work daily with some work such as signal PM on a routine. Signal workers will check in at The Deland Yard to make sure there is not an emergency then they will drive to Holly Hill Barn to receive assignments. Traffic marking meets daily to review work, and work is performed on a routine basis.

Work Requests and Tracking

The County utilizes a different work tracking approach for each division within Public Works. Some divisions share similar software, but often utilize them differently. Both Road and Bridge and Solid Waste use the TIS system, but Road and Bridge tracks service requests, work orders, time, materials and accomplishment where Solid Waste tracks overall time, complaints and citations. Further, Mosquito Control and Traffic Engineering use Primavera software. While Mosquito Control uses Primavera as a project scheduling tool, Traffic Engineering uses Primavera as a work tracking tool. Each division does track time to a daily payroll sheet.

Road and Bridge

Road and Bridge tracks all service requests and work orders in the TIS system (Figure 2-87). Work is generated by a request from either within the department or from citizens or another department. If the request is for an emergency, the supervisor and crew are called out for immediate response. The work is completed and a work order is made and after the fact to track labor, materials, equipment and accomplishment. Non emergency requests are entered into the TIS system as a service request and are sent to the supervisor for review. The supervisor inspects the site for County responsibility and for the resources needed to complete the job and creates a work order to perform the work.

Crews are then dispatched to the job site to perform the work. The amount of work completed each day, and the labor, equipment and materials are tracked at the end of each day on the work order. This time includes all out of yard hours to account for travel times. Once the work is complete, the work order is closed in the TIS system. Time and accomplishment for each work order is entered by administrative staff. System data is periodically exported for reporting on amounts accomplished, work orders completed versus created, and the number of service requests generated. Even work that is not created through a service request gets tracked in the TIS system including labor hours equipment hours, materials and work accomplishment.

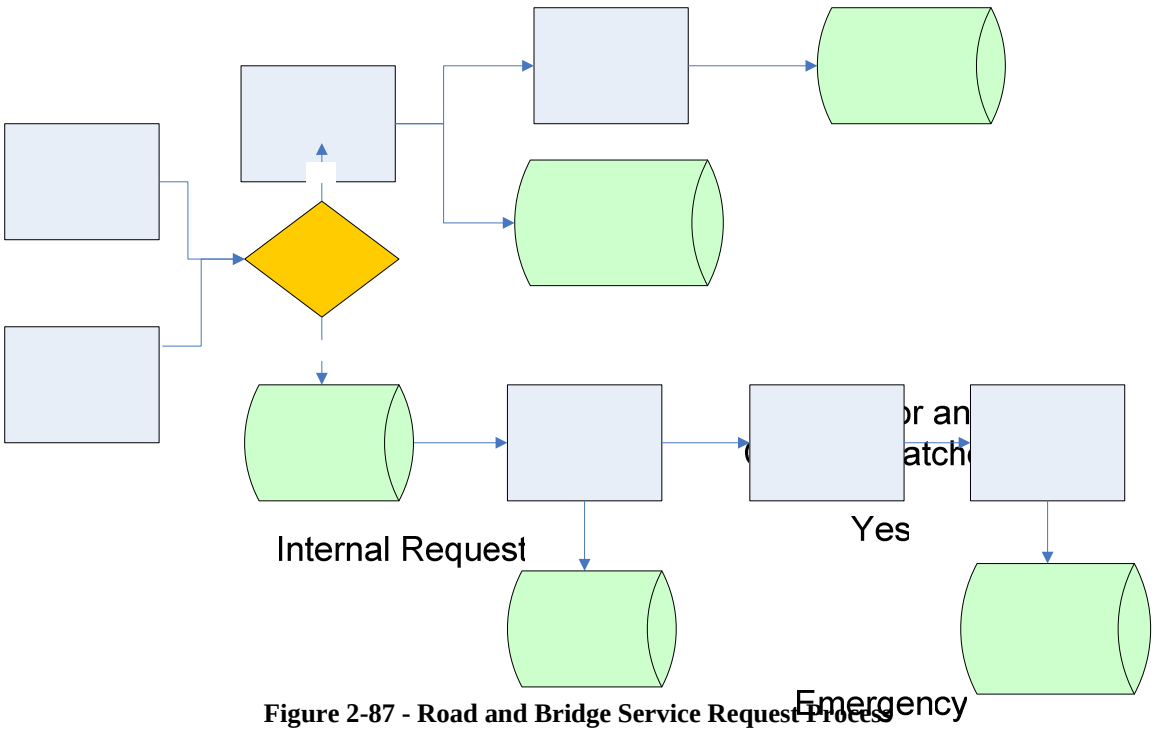

Figure 2-87 - Road and Bridge Service Request Process

Figure 2-88 shows the breakdown of work request types in FY 2005-06. The work types most requested are Minor Shoulder Repair, Hand Asphalt Patching (Potholes), Tree Work- Removal, Grading, Sidewalk Work, Litter Removal, and Clean Drainage System.

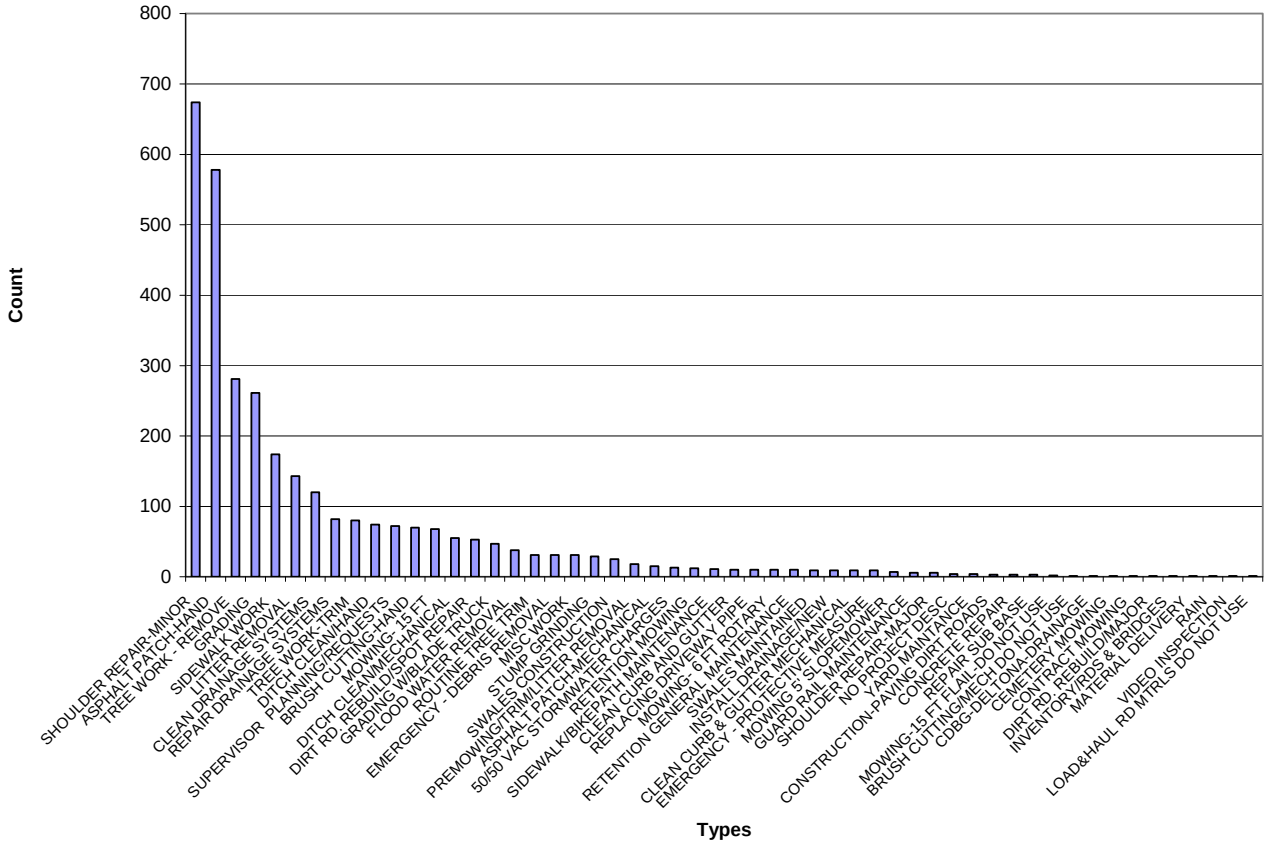

Figure 2-88 - Road and Bridge Service Requests

Traffic Engineering

Work is generated either by staff viewing repairs needed in the field, a citizen complaint, or through routine maintenance work. In the case of field staff initiated requests and citizen complaints; a manual form is created to document the service request. The form is then given to the supervisor to create a work order in MS Excel. Once the work order is created, it is assigned to a technician. Routine maintenance work is created in a manual MS Excel spreadsheet as a work order and then assigned to a technician. When the work order is assigned, the technician enters the work order into the P3 system. Work is then performed.

Once the work is complete, the technician completes the work order and also completes the travel log sheet manual form. The completed work order includes the labor hours, equipment hours, materials, mileage, and the accomplishment. The travel log indicates the time of travel, the reason for travel, and any time stopped. The travel log sheet and the work order form are then submitted to the administrative staff to record time and accomplishment. The administrative staff takes the work order form and enters the tech's time in the P3 system. Next, the administrative staff manually handwrites the cost for the job on each manual form. Reports are then run using the P3 system form billing. Data is then exported to MS Excel where other information from the manual forms is entered for

analysis, monthly reports and billing. Travel logs and mileage are received by an intern who manually calculates the travel time and the mileage. Mileage is entered in to the P3 system in one entry. The travel time is entered in a separate entry into the P3 system. The information from P3 for travel time and mileage is then exported to MS Excel where it is combined with other data from P3 and other information for internal analysis and to create the monthly reports (Figure 2-89).

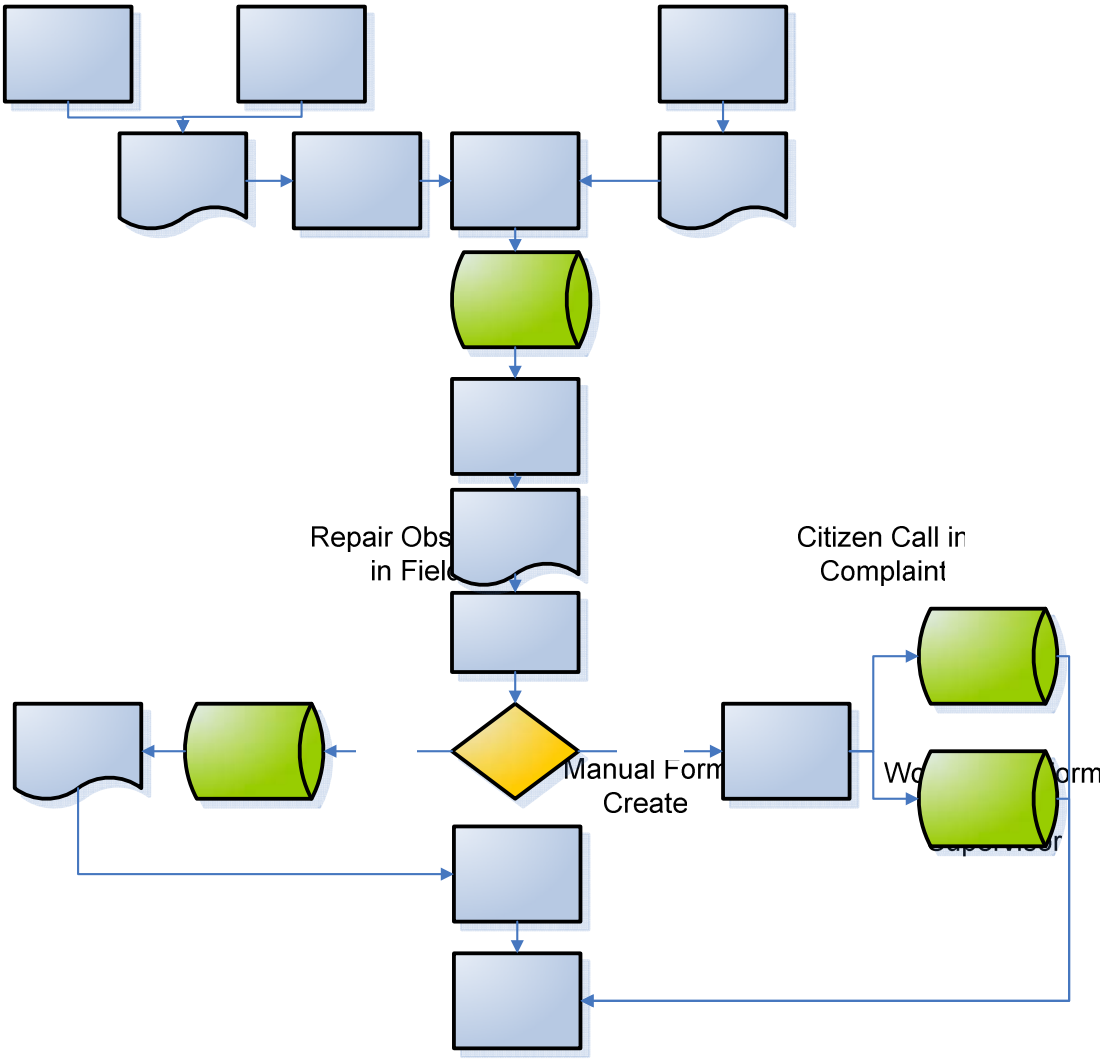

Figure 2-89 - Traffic Engineering Service Request Process

Figure 2-90 shows the amount of service requests generated versus the number completed by month between August 2005 and May 2006. The number of requests varies by month. August, September and May generated more service requests than were completed while other months had the same number of requests generated as were completed.

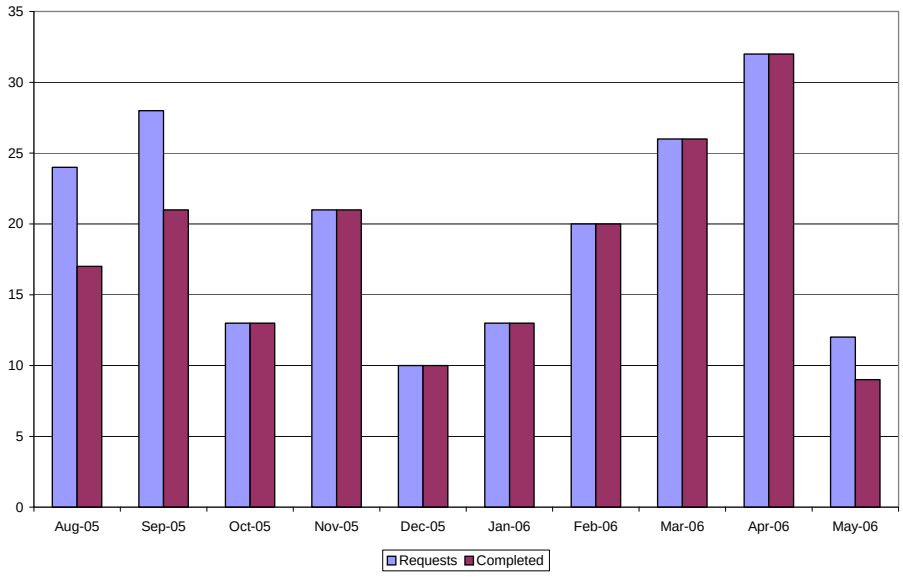

Figure 2-90 - Traffic Service Requests

Mosquito Control

The service request process for Mosquito Control is outlined in (Figure 2-91). Work is either identified by supervisors in the field, requests by contract cities, web complaints or by citizen calls or faxes. Requests are gathered and are manually entered into a Service Request Log spreadsheet where they are assigned work order numbers. The location must be found on a map and then a manual request form is filled out by the administrative staff. The form is then forwarded to the appropriate inspector supervisor who then assigns the request to an inspector to investigate.

The inspector travels to the site and inspects for the problem requested to identify a resolution. If the inspector can resolve the problem, work will be performed immediately. The requestor will be notified (door hangers are placed on residents' front door in case of citizen complaint). If the request cannot be resolved immediately, the inspector contacts the supervisor inspector who then reviews the area for other complaints. Spraying and fogging are performed when needed and citizens and the requestors are advised. Spraying information is recorded for state documentation. When the request has been resolved, the request form is completed and sent back to the supervisor inspector. Times sprayed, area sprayed and the amounts of chemicals used are documented for State reporting. The supervisor inspector finalizes and files the request. Summaries are provided to administrative staff to create monthly reports including the State report and monthly request reports analyzed by the Director of Mosquito Control. Currently, Mosquito

Control is not tracking travel time nor equipment time to work orders. One supervisor uses a Primavera system to monitor and bill heavy equipment projects.

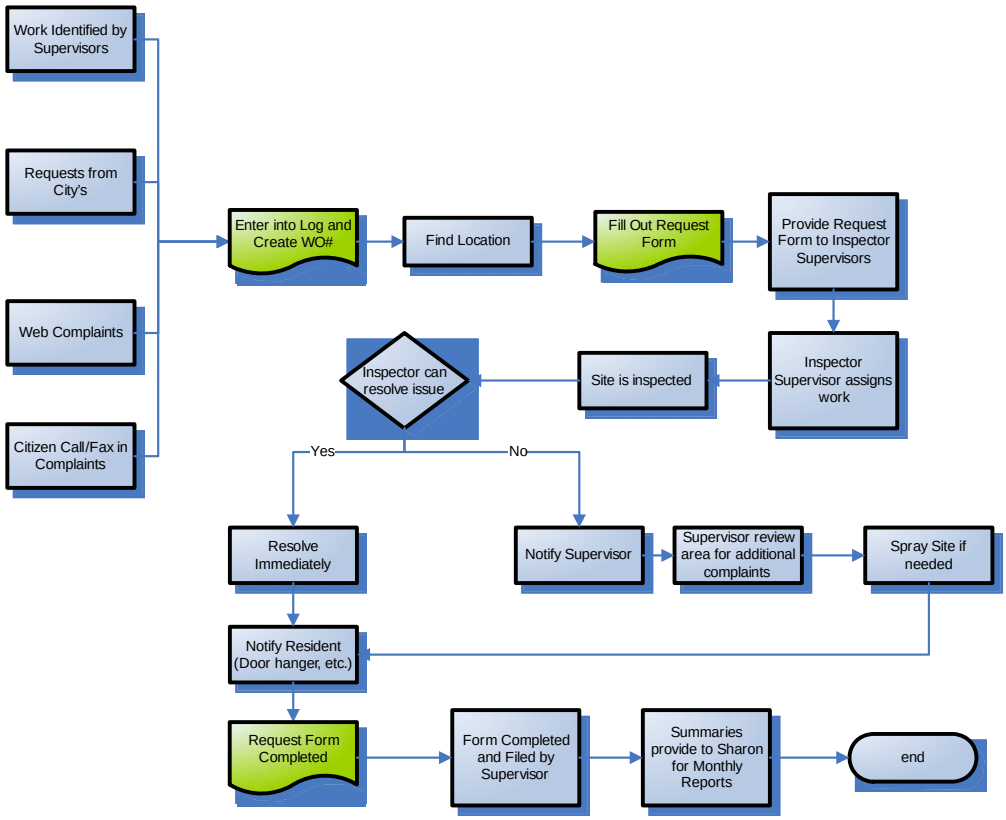

Figure 2-91 - Mosquito Control Service Request Process

The vegetation crew of the Mosquito Control division uses a separate process than Mosquito Control for service. Work is generated either from an existing site list or from a citizen or contract agency call-in request. Citizen and contract agency requests are sent to the supervisor for inspection. The supervisor inspects the site for needed resources and treatment. The supervisor then assigns the work from requests and from the existing site list to a crew either at the beginning of the day or after the job is verified in the case of requests. The crew then sprays the site and documents the locations using GPS, amounts of chemicals used, time of spray, and amount per acreage. This data is currently used as backup information for possible audits. The time and application amounts are also entered on the Vegetation Timesheets daily. The timesheets are sent to payroll and the labor, equipment, materials, and accomplishment are entered into an in-house MS Access database named Herb. Data stored in the Herb database is then used for billing the contract agencies and for monthly State chemical reporting (Figure 2-92).

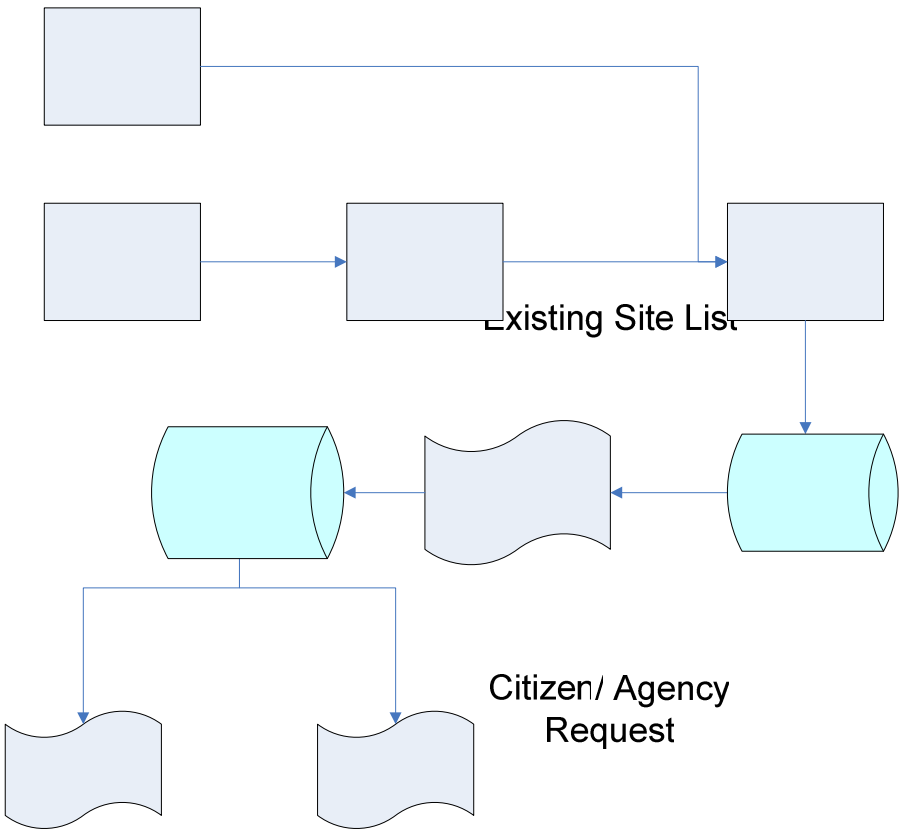

Figure 2-92 - Vegetation Management Service Request Process

Mosquito Control receives the majority of their service requests between April and October. Figure 2-93 shows the monthly distribution of complaints for mosquitoes and ditches between March 2005 and March 2006. June has the highest number of mosquito complaints, while the number of ditch complaints remains comparatively lower.

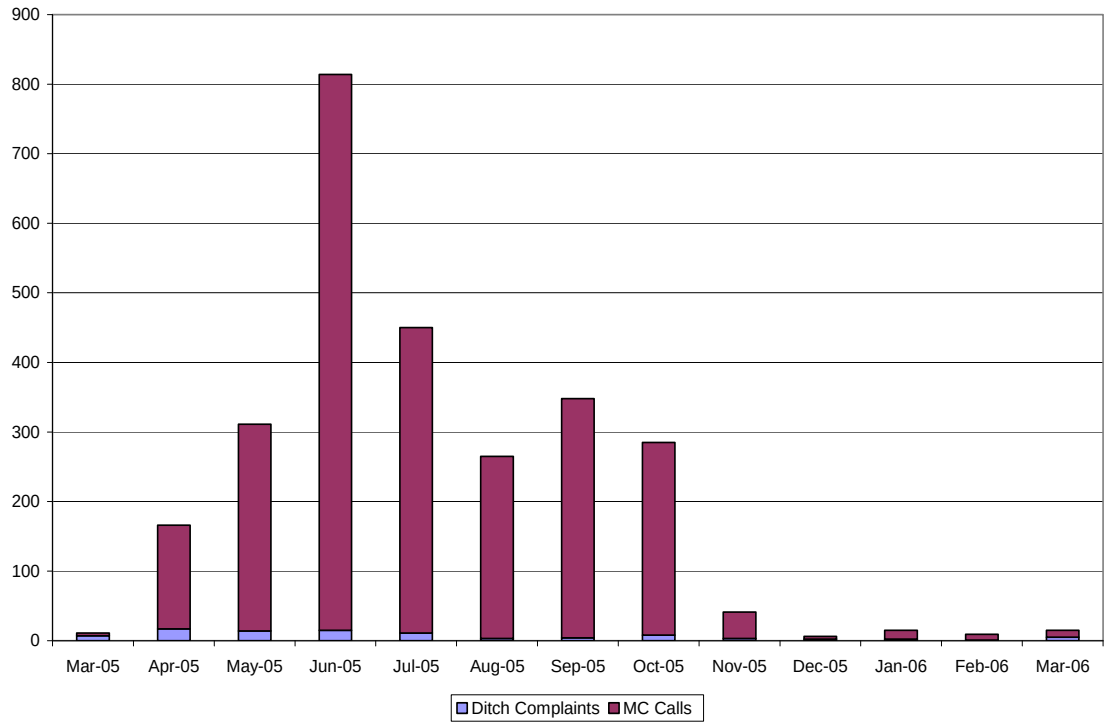

Figure 2-93 - Mosquito Control Complaints

The consistency of the data tracked by Mosquito Control needs to be verified. Data received from one supervisor in the New Smyrna Beach yard shows that the number of labor hours has decreased since 1995. Data tracked showed that 2002 had only 3,984 total labor hours, down from 6,712 the previous year and 5,798 the next year (Figure 2-94).

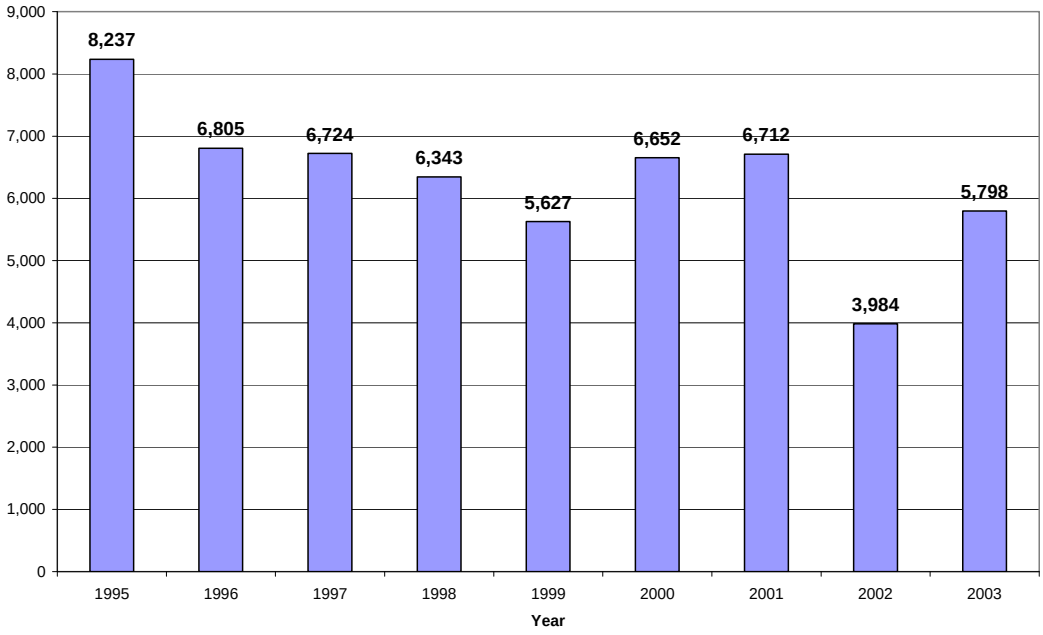

Figure 2-94 - Mosquito Control Hours

Water Resources and Utilities

Work is identified by field workers and citizen complaints in Water and Wastewater Utilities. When a field worker observes work that needs to be done, they fill out a manual request form which is sent into the office for processing. The service request is entered into the AllMax System to create a work order. Citizen and agency requests are entered directly into the AllMax System without a manual form. Once the work order is created, the supervisor reviews and assigns the work to be performed. The crew completes the work and fills out a manual form with labor, materials and other completion data. Equipment usage is not tracked. The completion data and the labor and materials are then entered into the AllMax System to complete the work order. Administrative staff runs monthly reports from the AllMax System. Figure 2-95 outlines the service request process for Utilities.

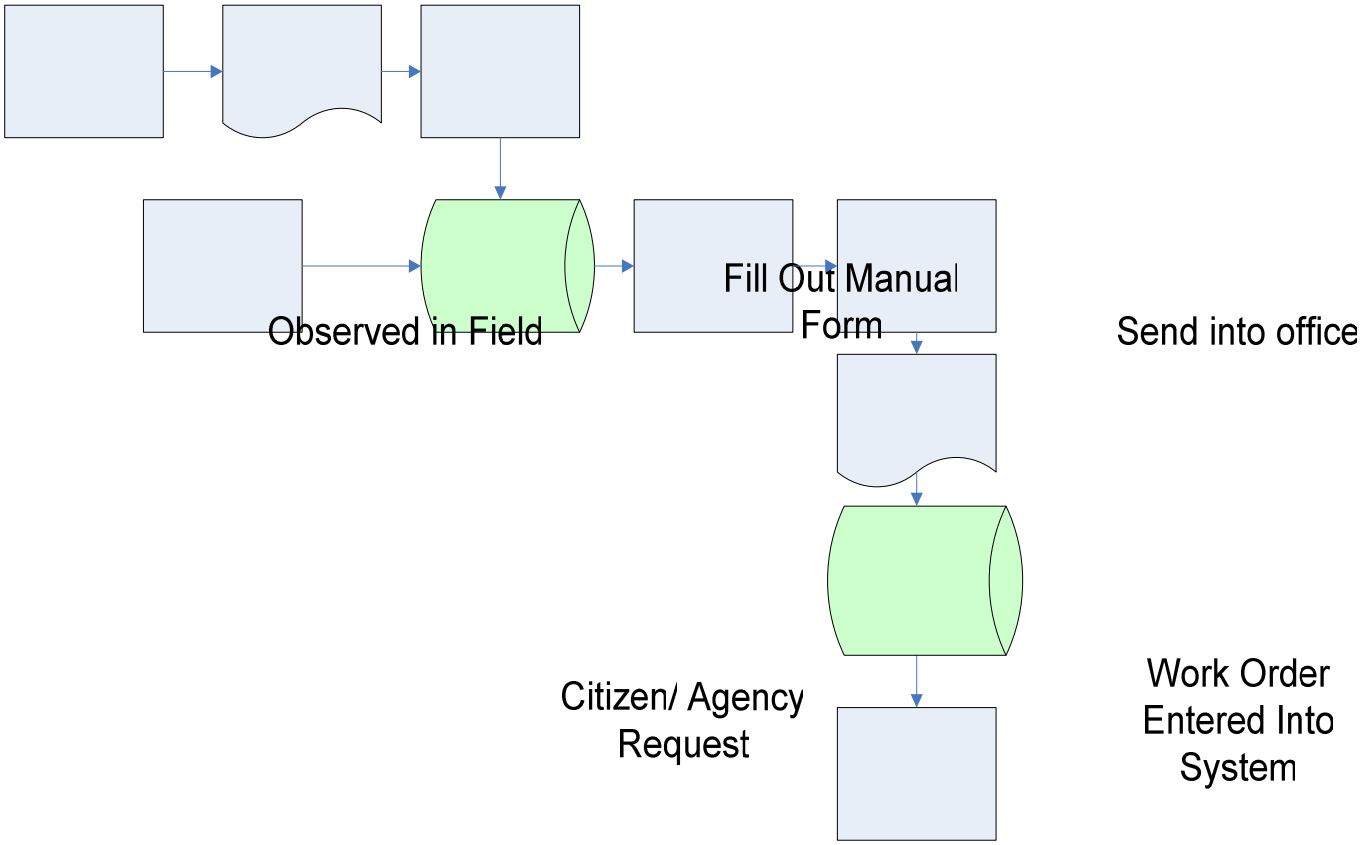

Figure 2-95 - Utilities Operations Service Request Process

The number of work orders tracked in the system is increasing. Work orders tracked jumped from 5,230 in fiscal year 2003 to 8,655 in fiscal year 2005, an increase of 3,425 work orders. The majority of the work orders performed are for water and sewer locates. Seventy percent of the work orders generated (5,395 of the 8,655) in fiscal year 2005 were for locating water and sewer facilities (Figure 2-96).

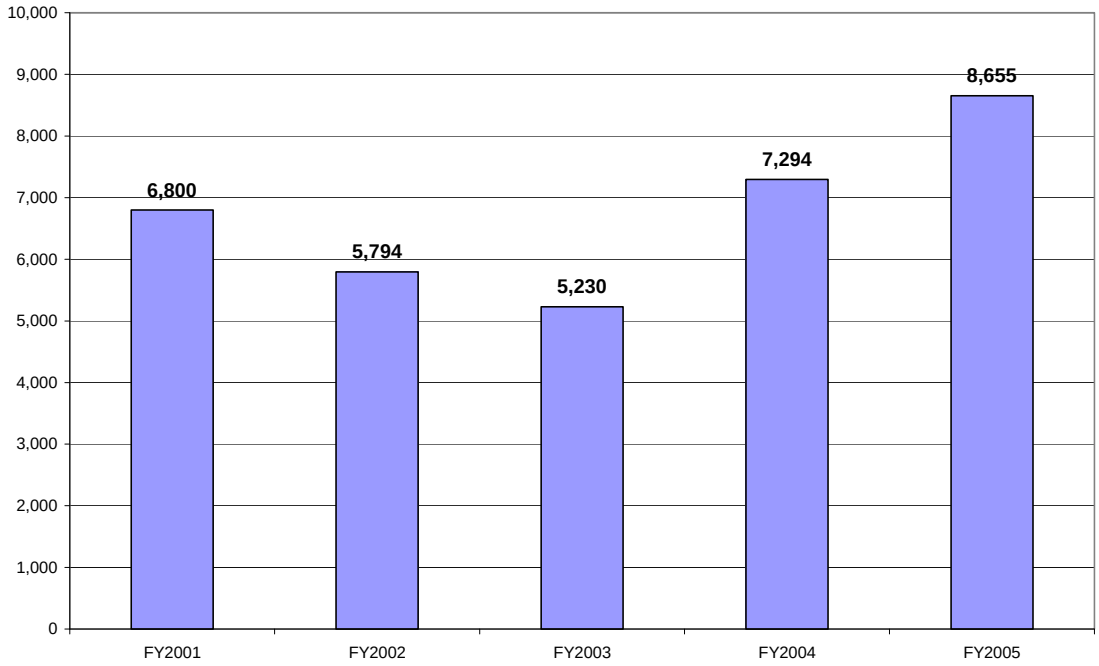

Figure 2-96 - Utilities Operations Work Orders

Solid Waste

Solid waste generates service requests by citizen calls and through web requests (Figure 2-97). Citizen calls are logged on a paper hard copy form. If it is not a compliance issue, the request is entered with web requests into the Waste Management database. Garbage collection is an example of a request not associated with compliance. Solid Waste calls the citizen to verify that the problem still exists. If the problem is resolved, the resolution is entered into the Waste Management database. If the problem still exists, Solid Waste verifies that the problem has existed for 24 hours or more. If it has been less than 24 hours, no action is taken to allow Waste Management time to respond. If the request has been outstanding for more than 24 hours, Waste Management is notified. Solid Waste then calls the citizen at a later date to verify that the request has received action from Waste Management. If the problem has been resolved, Solid Waste enters the resolution data in the Waste Management Database. If the request has not been resolved, Waste Management is fined and contacted to respond.

Items that are compliance related such as discarded tires, trash piles and illegal dumping are forwarded to administrative staff and are entered into the TIS database. A compliance inspector receives the complaint and inspects the location. If the location has had less than three (3) violations, a warning is issued and the complaint is completed in the TIS system. If the location has had three or more violations, a citation is issued to the responsible party. Once the citation has been issued, the complaint is closed in the TIS system. Monthly reports from the TIS system regarding the number of compliance issues are emailed to Pat McCormick. Reports are also run for open compliance issues monthly from the TIS system for the compliance inspector to address.

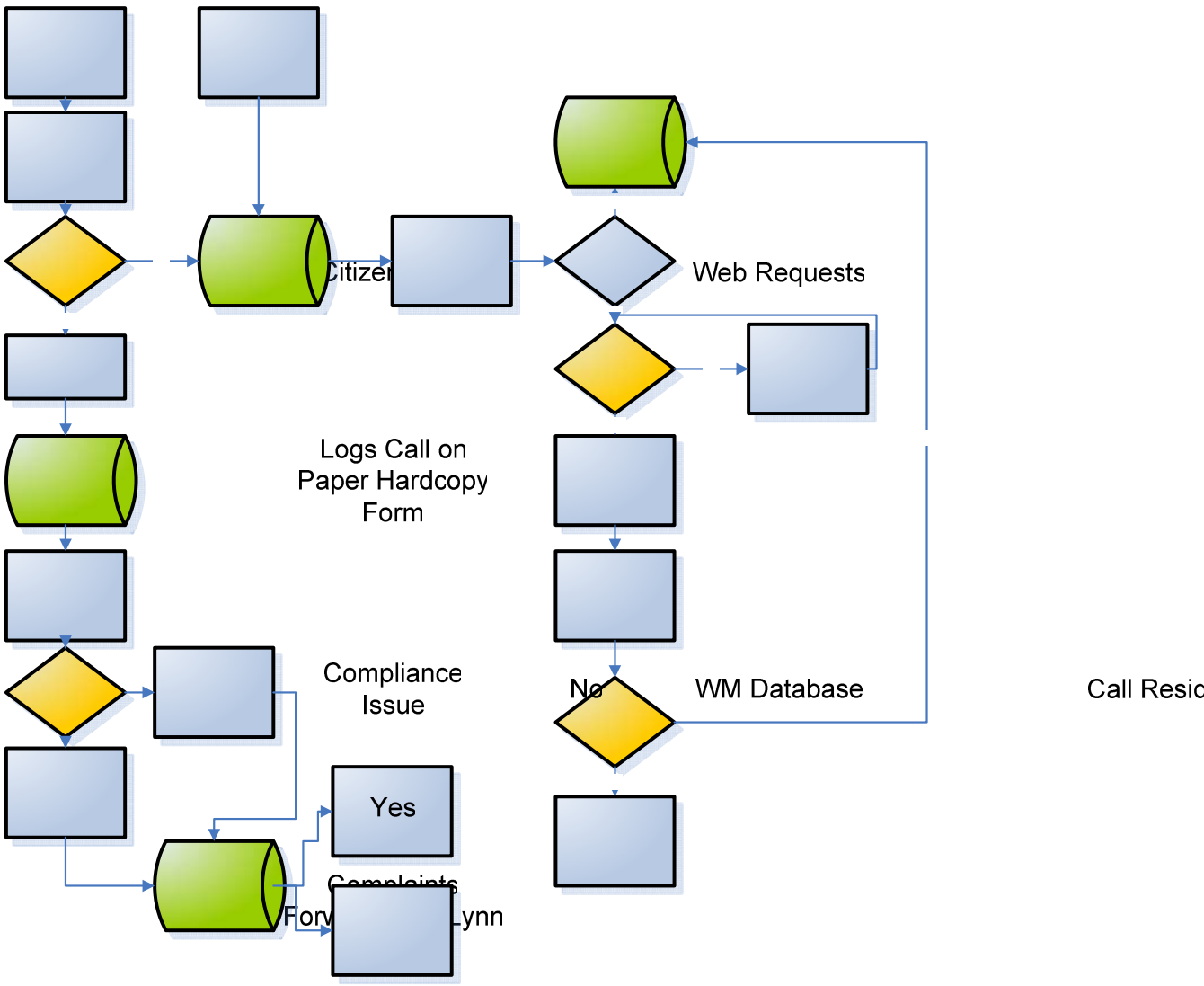

Figure 2-97 - Solid Waste Service Request Process

Work performed is not currently stored in the TIS system as it is for Road and Bridge. Time is recorded for payroll purposes, but is not recorded to an explicit activity.

Figure 2-98 shows the number of responses to complaints by year since 1999. The number of responses has remained relatively constant with data ending in May of 2006. The number of warnings and citations issued has decreased since 1999 (Figure 2-99). Citations issued peaked in 1999 with 39 and has decreased to a relatively constant 10 per year with 4 issued as of May 06. Warnings issued have decreased since the year 2000 from 1,055 issued to the current year of 352 issued.

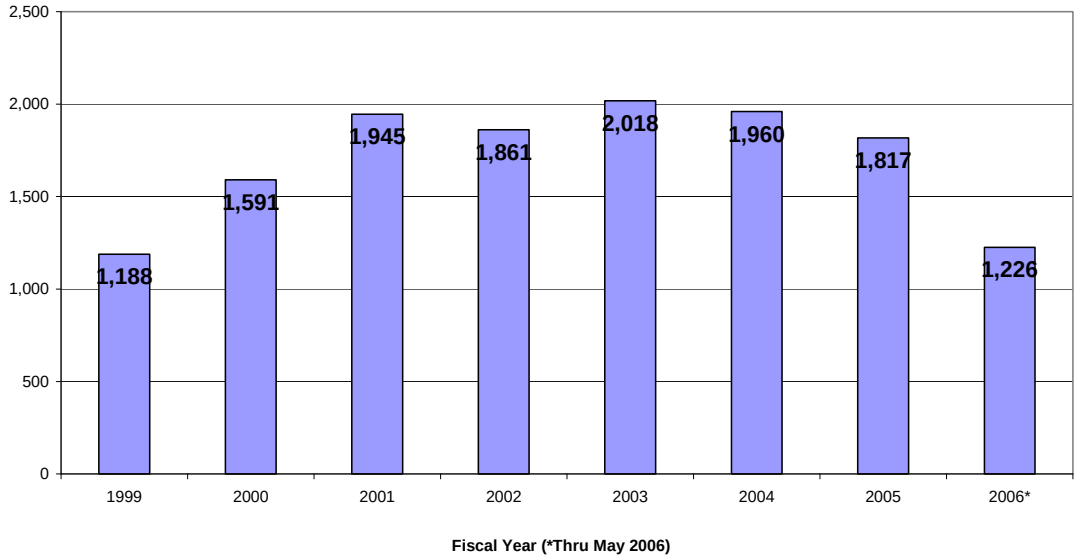

Figure 2-98 - Solid Waste Response to Complaints

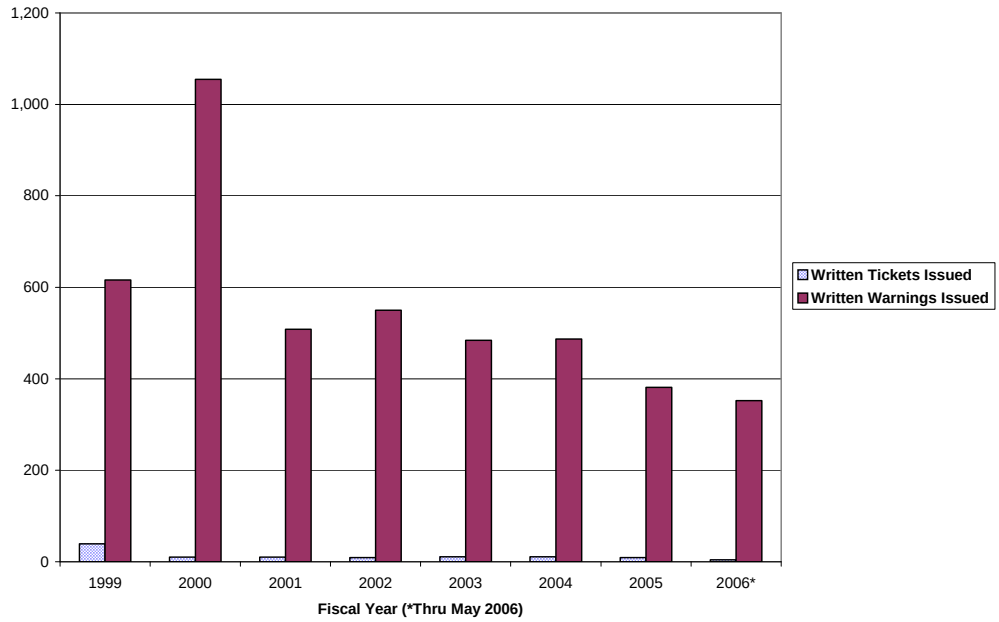

Figure 2-99 - Solid Waste Written Tickets and Warnings Issued

Construction Engineering

Construction Engineering tracks projects and general timelines for projects in an internally created MS Access database. All time is tracked on daily payroll timesheets.

Systems

The County maintains several independent databases for maintenance and operations. The databases are maintained in a variety of different systems and applications. Further,

there are additional inventories and files, which are tracked manually or in MS Word documents and MS Excel spreadsheets. A list of the major databases and work spreadsheets identified and their functions is provided below.

General Systems

1. LifeTrak – The County is currently implementing the LifeTrak vehicle GPS tracking system. On select vehicles throughout the agency a tracking device has been put in. Supervisors can log in and view the location of the vehicle. Further, the system allows historical data to be viewed. County employees must also complete a manual log or "truck sheet" with location to parallel the LifeTrak history.
2. Kronos – Kronos is a timekeeping system used by the County. It is used to track general time and leave and utilizes biometric or fingerprint scanning technology.
3. GroupWise – GroupWise is the e-mail system utilized throughout the County. The system allows users to check the schedule availability of users from other divisions.
4. GIS – GIS product from ESRI vendor is utilized at varying degrees by the divisions within Public Works based upon experience and desired need. A GIS specialist is available for the divisions at the administrative level while some divisions also utilize the information more extensively such as Mosquito Control and Water and Utility Operations.

Road and Bridge

5. Transportation Information System (TIS) – TIS is an in-house developed system that was designed specifically for Road and Bridges, although it is used by other divisions of Public Works. The system tracks labor hours, equipment hours, material used, and accomplishment by project and activity. The system is also used for monitoring service requests.
6. Equipment Spreadsheets – Road and Bridges maintains an inventory of its rolling stock on MS Excel spreadsheets. There are multiple spreadsheets which are separated by supervisor. There is a service spreadsheet as well used for tracking PMs and service information.
7. MS Access and MS Excel used for analysis of TIS – MS Access is used extensively for performing analysis of data from the TIS system. Administration will export data from TIS and provide the file to Roads and Bridges in MS Access or MS Excel to perform analysis. For example this was done to analyze the Dirt Road Program Costs.
8. GIS– In addition to inventories stored in TIS Road and Bridges utilizes GIS for storing inventory data.
9. MS Access Database for Monthly Benchmarking – Information in TIS is exported into an MS Access database monthly. The database is then used to create benchmarking reports.

Traffic Engineering

10. Primavera P3 – Traffic Engineering used P3 extensively. The system is used for tracking working. Information entered into the system includes labor, equipment,

material and accomplishment. In addition mileage traveled separately. This system is also used for requests.

11. Crash Database – A database exists for monitoring and tracking vehicle accidents.
12. MS Excel List with Requests– To tracks request other than for signals and MS Excel spreadsheet exists.
13. Liberty (Scanned Documents) - Traffic Engineering is currently having documents scanned into the Liberty system. Liberty is used for storing and managing scanned documents.
14. DeBary Revenue.xls – Revenue from the City of DeBary is tracked on an MS Excel spreadsheet.
15. Traffic Monthly Report.doc – A monthly report is created in MS Word that is sent to the Director that summarizes information.
16. Traffic Signals DBA – An inventory of Traffic Signals exists in MS Access.
17. DOS System for Traffic Signal Timing- This system is used for monitoring and can be modifying signal timing of traffic signals.

Mosquito and Vegetation Control

18. Chemical Inventory – Mosquito Control maintains a chemical inventory in MS Excel. The inventory tracks usage of material and quantities available by chemical name for Mosquito Control.
19. Monthly Report – Mosquito Control summarizes information into a monthly report which is provided to the Director of Public Works.
20. Vehicle List – An inventory of vehicles Mosquito Control is responsible for is maintained in MS Excel.
21. Primavera (P3) – One supervisor within Mosquito Control uses primavera to track projects.
22. Chicken Records – An MS Excel spreadsheet is used to monitor chicken records. Information includes the date the chicken was put in or out and if it was found dead.
23. Rainfall Report – Rainfall from various locations are tracked in an MS Excel spreadsheet.
24. ULV- ULV work is documented on a monthly worksheet in MS Excel. Data contains who performed work, when, the chemicals used and are treated.
25. Equip Downtime – Equipment downtime is monitored in an MS Excel spreadsheet.
26. Veg Chem. usage and cost – An MS Excel spreadsheet is created by exporting data from the HERB system and used for reporting to track cost and usage of chemicals for Vegetation Control.
27. NSB Spray Projects – Mosquito Control Spray projects at the New Smyrna Beach Mosquito Control site are monitored by MS Excel.
28. Herb- An in house MS Access database is used to monitor vegetation control in New Smyrna Beach. The database contains work tracking information.
29. Legacy 6000 – This is on one spray truck and is software that monitors chemical application on the spray trucks. This also utilizes Road Management System (RMS) software for GPS tracking of chemical application.

30. Vector Control Management System VCMS (not utilized) – VCMS is designed to be used to track and monitor work performed for mosquito control agencies but is not currently being used by the District.
31. Service Request Log – Citizen Service requests are logged into and MS Excel spreadsheet.
32. Skytrak/Wingman- The helicopter is equipped with GPS software that tracks the flight and spray patterns.

Water and Utility Operations

33. BillMaster (Billing) – BillMaster is utilized to bill water, wastewater and reclaimed water by account.
34. Testing Spreadsheet by Plant – Each plant has MS Excel spreadsheet which is used to monitor test results from sample taken.
35. Flow Spreadsheets – Daily flow is tracked at each on of the plants. This is monitored in MS Excel and compiled into annual report.
36. Sludge Hauling log – Sludge hauling is tracked in MS Excel and compiled into annual report.
37. Weekly generator log – Weekly the run time is documented for generator on manual log.
38. Required Reports-MOR and DMR– Water Operations and Utilities is required to submit the report for the Department of Health. These are compiled from other MS Excel spreadsheets and entered into MS Excel.
39. Dataflow (SCADA) – Dataflow is a SCADS system utilized by the County. It has the ability to monitor remote sites and many data points within each site.
40. Wonder ware Satellite Telemetry System – Wonder ware is a satellite telemetry system that can be used to monitor remote sites that do not have Dataflow.
41. AllMax (WOs) – AllMax is a work order based system. The main users of the system are the administrative staff and the water distribution and wastewater collections supervisor. The system is also utilized for monitoring inventory.
42. License- Utilities has an MS Excel spreadsheet with a list of licenses.
43. Network viewer – Video security system that is used for monitoring plants.
44. Acct Payable. DBA – Accounts payable database in MS Access is used by administrative personnel.
45. Chemical. DBA – MS Access database is used for monitoring chemicals.
46. Tokay (Backflows) –Backflow program is monitored using the Tokay system. Results are entered into the system. The system generates letters to residents if testing needs to be done.
47. MS Access Database with inventories – An MS Access database exists which is utilized by Utility Engineering and GIs but is not update by operations. Data in the database and Utility engineering can be inconsistent.
48. Various MS Excel Files – MS Excel spreadsheet are the main method the utilities operations uses to track testing and work monitoring. In addition to the spreadsheets above there are numerous additional MS Excel files. MS Excel is used for the following purposes: invoice totals, sludge hauling, mow inspection, track and monitors testing, incidents, and drinking water monitoring requirements.

Solid Waste

49. E-Scale (2 DBs) – E-scale is used for tracking and charging dumps fees and commercial and non-commercial vehicle enter the landfill and transfer station.
50. Permits& Requirements (XLS) – Solid waste has an MS Excel spreadsheet that it used to monitor permits and requirements. There is a separate tab within the spreadsheet for each location including the Tomoka Landfill, Plymouth Landfill, the transfer station and Tomoka DMRs.
51. TIS – TIS is used to enter all service requests that do not pertain to the contract with Solid Waste management to pick up residential trash.
52. Waste Management Web Requests – There is Web based service request system used by Solid Waste division to track service request made as a result of residential trash pickup which is performed by Solid Waste Management through contract. Solid Waste Management can then MS Access the requests and resolve.
53. Gel Corporation MS Excel file – Contract with Gel contract is monitored by entering tickets into MS Excel spreadsheet.
54. AHRS (Financial) – Used for entering payroll.

Construction Engineering

55. Monthly Utility Project Status Report – Once a month a summary report is created and submitted to the director by project in a MS Word document.
56. ROW Monthly – The right of way manager submits a report monthly by project than has the in house staff performing the project, when it is scheduled to begin and end, the number of parcels, how many parcel have been acquired and the amount remaining.
57. Project Status – a month project status is created that has the project name and the project status in MS Excel.
58. Primavera P3 (Not Utilized) – Primavera is a project planning system that the County attempted to use but is no longer utilized by Construction Engineering.
59. FY06/07 Road Program – The road program includes project plan including, funding sources. The program has been estimated FY 10/11 but is updated as needed.
60. In-house project DBA – An in-house MS Access database was developed as a result of collaborative effort of construction engineering personnel. The database has project types and is used to store project notes and completion information. The database. Utilization of the database varies by personnel.

Stormwater

61. Ditch Maint MS Access DB – This was developed in-house to monitor inspection and contains information on specific stormwater ditches.
62. Stormwater Request MS Access DB – The stormwater request database is an in-house developed system used to monitor stormwater request between administration group, Road and Bridges and Mosquito Control. Calls are assigned by administrative staff to the appropriate division.

Fleet Systems (Managed Outside of Public Works)

63. Faster Fleet System – The Faster Fleet system is used by the Fleet Division outside of public works. The system has fleet inventory information as well as tracks usage, and work history of vehicles.
64. GasBoy Fuel System – The GasBoy fuel system tracks fuel usage by vehicle. A linkage has been created from GasBoy to the Faster Fleet System to import fuel usage and cost data to the faster fleet system.

Systems Use and Users

The County has a variety of systems, databases, spreadsheets, MS Word documents and manual forms that is uses the analyze work. While work is tracked in many cases the reports produced are as a result of response to inquiries, billing and selective month end and yearly summaries. Figure 2-100 provides a general flow of information.

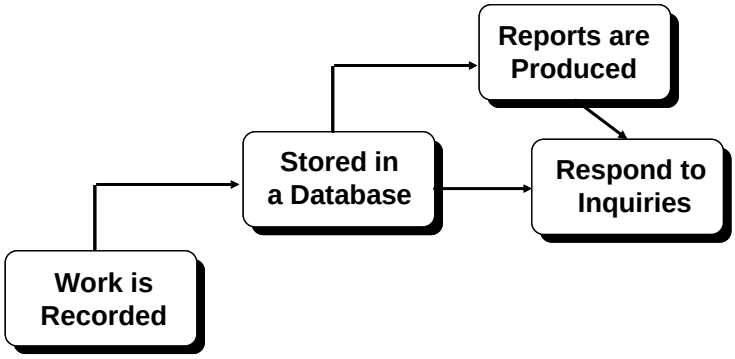

Figure 2-100 - Information Flow

The reports that are produced are created and used by limited personnel. In general for all division it is the administrative staff that enters and compiles data and generates monthly reports and billing. In many cases the data can be difficult to retrieve and understand. As a result data is often exported from the system that it is entered in to an easier format such as MS Excel or a MS Access database for analysis.

All divisions compile a monthly report for the director of Public Works. These summaries are provided in a MS Word document and the content varies by division. There is no set standard format for providing the summary and is left at department's discretion. Information is compiled manually and comes from a variety of sources. The following sections outline the major system uses by Division.

Road and Bridges

Road and Bridges record all work tracking information in the TIS system. This includes labor, equipment, material, work quantity, accomplishment, project numbers and service requests. While the system is powerful and provides a variety of work tracking options data retrieval and analysis within TIS is difficult. To perform analysis on data from TIS the data is exported into MS Excel or MS Access files for further analysis. This is done by the engineering assistant within the administrative group.

A monthly benchmarking report is created for select activities by exporting information from TIS into a MS Access database that has existing reports already created. Additional used for the TIS data is billing for contract cities and FEMA reporting if necessary.

Road and Bridge also compiles monthly summary for the Director of Public Works

Mosquito Control
Mosquito Control has a variety of systems it used for work tracking including MS Excel spreadsheets, GIS, P3 and HERB MS Access database.

Information that is tracked in MS Excel spreadsheets is compiled by the administrative staff at the Daytona Beach site for use in the monthly summary to the Director. Information included in the monthly report for mosquito control includes project accomplished, complaints investigates, entomological report by species and summaries of the various mosquito control functions such as aerial, stormwater, and heavy equipment.

The Heavy Equipment/Ditch cleaning supervisor also utilizes Primavera (P3) to track projects. The main use of this data is for billing purposes.

Other uses of the data by Mosquito Control are for mandated state required reports such as chemical usage and billing. Mosquito Control performs work for others. This work is tracked in MS Excel spreadsheets by the administrative coordinator. Chemical usage is compiled in MS Excel and transferred to the Florida department of agricultural and consumer services report in Microsoft work.

GIS is also used by mosquito control to produce maps of areas to be inspected and sprayed or areas where midge spraying has been done at lake Monroe. Vegetation management also utilizes GIS. The GPS software in the helicopter has the ability to produce maps that show the route flown along with the spray swath. The legacy 6000 system can also produce maps in GIS.

Solid Waste
Solid Waste tracks data in MS Excel spreadsheets, TIS, e-scale and the waste management request system. In general the TIS system is used to create monthly reports and to verify if there are open tickets or citations. The waste management database is utilized to ensure that waste management contractor is responding to citizens needs. Administrative staff can open the database and review if items has been resolved or put in notes regarding how a request has been resolved once they have contacts the customer.

The e-scale system tracks vehicle and tonnage as they enter the Landfill and Transfer station. The main use of this data is for billing purposes by the administrative support function of Solid Waste.

In addition, Solid Waste supervisors utilize MS Excel spreadsheets for tracking grinding tonnage, cover hauled by loads and tons. In general this information is used for in-house purpose and monitoring.

Water Resources and Utilities
Water resources and utilities utilize BillMaster, MS Excel, Tokay and the AllMax system for developing reports.

The BillMaster system is utilized for billing for water, sewer, and irrigation. The system contains meter and customer account information. The system is used at the Administrative/Engineering office by the Utility Billing staff. The main use is for billing but the system is also used to run summary reports for billing.

Utility Operations utilizes MS Excel and AllMax for work tracking. The AllMax work order is utilized for billing. Administrative staff can see the labor and materials tracked on a work order and bill if necessary. In addition work orders created in the AllMax system are used in the monthly summary reports to the director as well as in the annual report produced by Utility Operations.

The Tokay system is utilized for Backflow devices. The main use of the system is to identify devices that need to be inspected and it is utilized by administrative staff at the Deland Yard.

Water and Waste Water Treatment Operators have a myriad of MS Excel files they utilized to document work in the field. The spreadsheets are sent to the office where they are compiled for state required reports. The spreadsheet are also used to summarize information for the monthly reports as well as compiled for the annual report for Utility Operations.

Traffic Engineering
Traffic Engineering utilizes MS Excel and P3 for work tracking. In general work is entered into the P3 system. Once data has been entered P3 can be utilized to run some standard reports as well as create invoices. Data is entered into the system by administrative support personnel and billing is monitored by the administrative coordinator. While P3 stores the data the system can often be difficult to retrieve or manipulate data. In many instances the data will be exported into MS Excel for easier use and data compilation.

In addition to billing, the P3 data is summarized in the monthly report provided to the Director.

Construction Engineering
Construction engineering has an MS Access database that was developed in house for tracking projects. The system is used in varying degrees by project managers. When utilized, the system can provide notes and status on projects. Project managers are

provided monthly summary reports and through manual compilation provide information to the Director.

Work Processes

The County has established and utilizes certain management processes within the Public Works Department. In this review, four general management functions were specifically evaluated: planning, organization, scheduling and controlling. During our review, all four functions were observed in varying degrees of effectiveness in each of the divisions.

Purchasing Process
The County has established purchasing procedures as outlined in Figure 2-101. The procedure used is determined by the price of the item under $750 it can be purchased using a credit card or with approval from an authorized individual. For items greater than $750 the process begins with completing a requisition form and sending it to purchasing. If the item is already available through an existing contract then the item is authorized and sent through the approval process.

For items that are not on an existing contract the specific process is determined by the price of the item. If the item is between under $3,000 then a verbal quote must be received prior to authorizing the purchase. If the cost of the item is between $3,000 and $10,000 then a minimum of three verbal quotes must be obtained prior to authorization. For items ranging in cost between $10,000 and $24,999 then three written quotes must be obtained along with approval from the County manager or purchasing director. Items greater than $25,000 must be sent out through formal sealed bid process. The bids are evaluated by purchasing and the end user. Once the bidder has been selected, it must be approved by the County council prior to being authorized by purchasing.

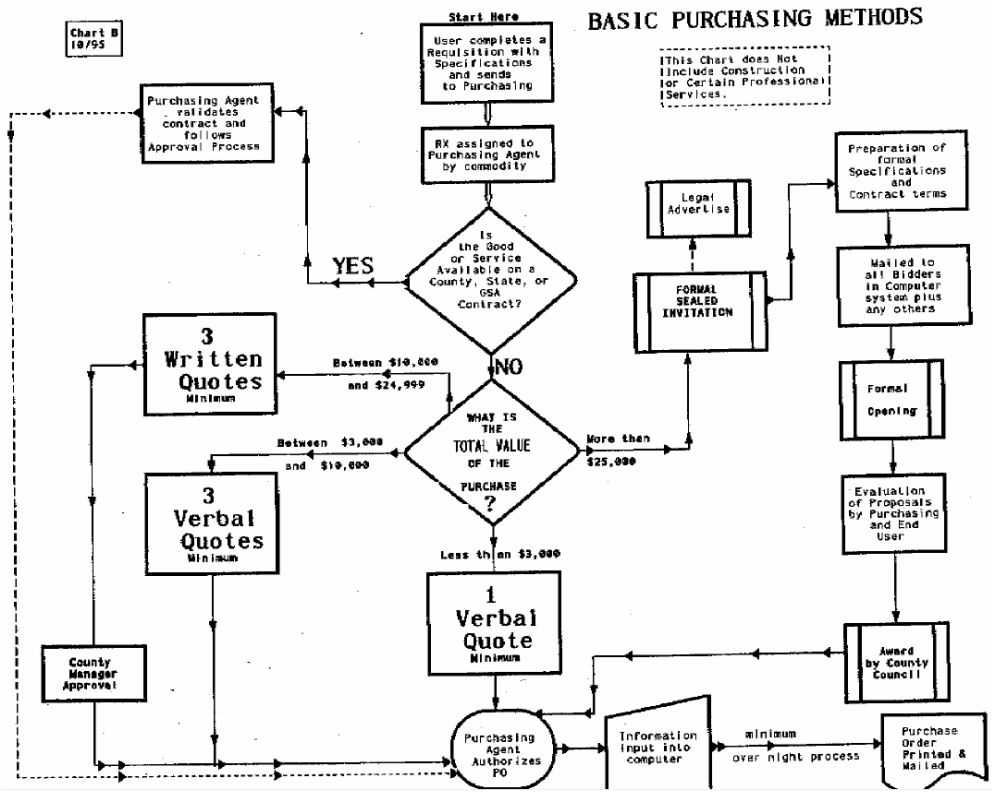

Figure 2-101 - Purchasing Procedures

Material Control Process

The material control process varies by division. In most cases each division utilized a separate system for monitoring their material inventories.

Utility operations used AllMax software for performing inventory control. A complete list of items stored in the Deland Yard warehouse is within the system. As items are checked out for use, they are entered into the system. Further, materials used for a work order are tracked directly to that specific work order within AllMax. This allows for more accurate billing including the cost of materials.

Road and Bridges use the TIS system for performing inventory control. A complete list of items stored at the Deland Yard warehouse is within the system. Each morning the warehouse manager (supervisor) inputs the material receiving and issuing transactions as items are checked out for use that day.

Mosquito Control uses MS Excel for tracking chemical inventories and usage. As chemicals are taken from the warehouse they are logged in MS Excel. The actual usage of the chemicals is determined based upon the amount and type of spraying that was performed.

Traffic Engineering uses the P3 system for monitoring and tracking the use of materials.

Solid Waste and Construction Engineering have a material inventory control process.

Management Functions

Typically, a well-structured management process involves completion of the planning, organization, directing and controlling functions regarding maintenance. A graphic of this process is depicted in Figure 2-102.

The ideal management of maintenance follows four general phases - planning, organizing, directing and controlling. There are several activities that are applied to allow these basic processes to occur. These are shown in diagram below. This model is used as basis for most of our observations.

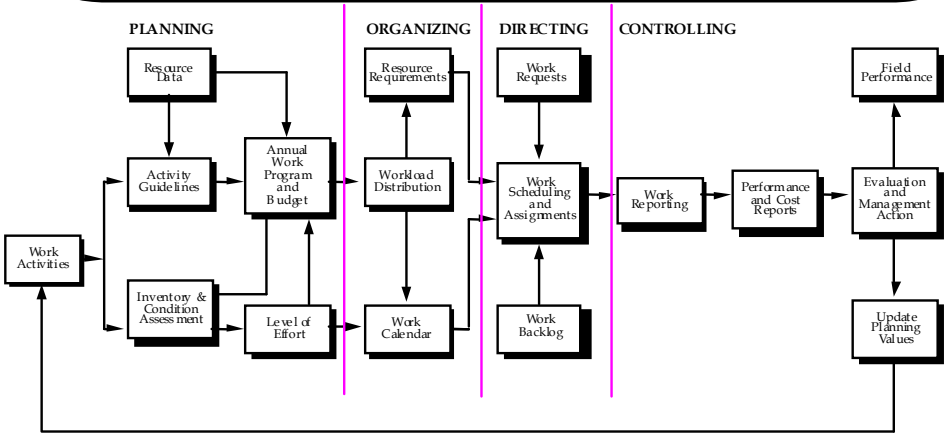

Figure 2-102 - Ideal Management Process

The planning effort involves determining major activities, defining guidelines, obtaining resource information, performing a condition assessment, and computing the level of effort that, in turn, allows a work program and budget to be determined. Upon completion of the process, the planning effort determines for the agency the amount of work to be performed on an annual basis. The next phase, organization, further divides the work program into work to be performed on a monthly basis. This phase allows the work by activity and resource requirements (labor, equipment, and materials) to be determined each month. The direction phase uses the calendar, work request, routine maintenance programs and work backlog to generate a short-term schedule. This schedule is then used to direct staff to perform work by location. The completed work is recorded and tracked by the automated system. A series of outputs are then generated which give supervisors the planned versus actual effort of maintenance. This information is used to evaluate the field effort and identify opportunities to improve field performance. Actual accomplishment information derived from processes is used in each year's update process. The County's existing work processes are outlined below for each division.

Road and Bridge

Road and Bridge is performing some of the existing practice as outlined above in Figure 2-102. For the planning component a complete list of activities has been created and many of the inventories have been created. Several of the activities are on routine cycles and levels of effort have been determined. This information has not been linked with the resource data, level of effort and condition information to develop a work program and budget. Road and bridge is performing organizing functions of distributing the work plan and determining resource needs on an individual "supervisor by supervisor" basis. Some functions of directing are being performed or are partially being performed. A complete work request system has been developed along with ability to backlog projects. This information is being used to distribute work daily at crew meeting that are performed while larger projects are schedule weekly at the supervisors meeting.

Some of the controlling functions are being performed. Work performed is tracked in the TIS system which is then used to develop reports by project. Monthly benchmarking reports are created and compiled. These reports are available but are used on a limited basis to modify work practices and improve operations; their main focus is on documentation of work done. While Road and Bridges is performing some of these management practices yet still lacks an intergraded and institutionalized continuous process for the functions to be utilized. Figure 2-103 indicates the specific processes that Road and Bridges is performing. A check indicated the process is being performed and a "P" indicates the process is partially being performed.

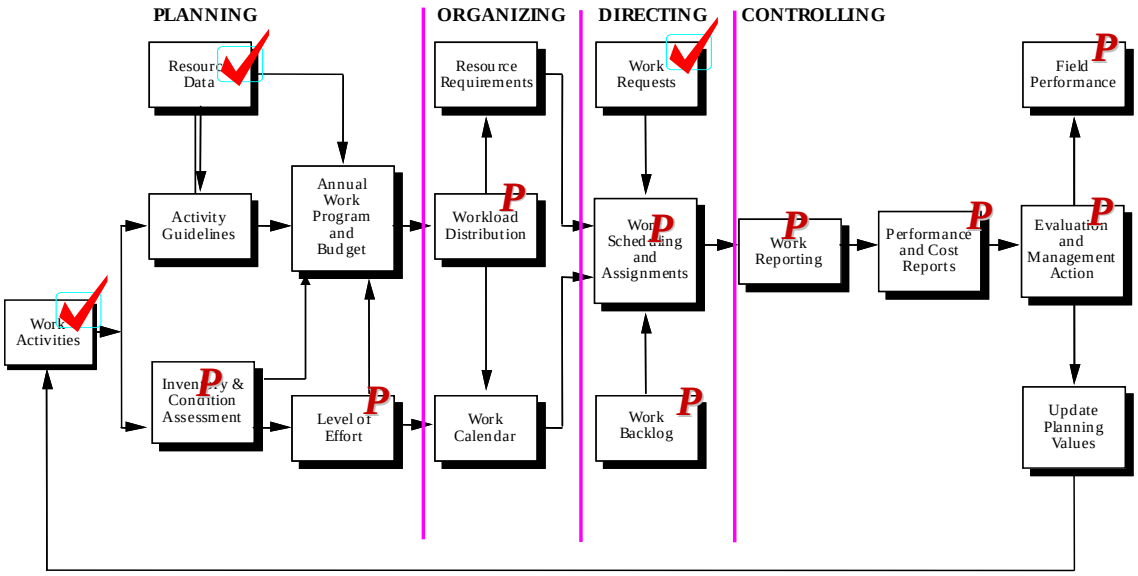

Figure 2-103 - Road and Bridges Work Management Process

Mosquito Control and Vegetation Management

Mosquito Control is performing a few management practices as outlined in Figure 2-103. Mosquito Control and Vegetation management are minimally performing work planning practices. Some activities have been identified but complete guidelines have not been developed. A work program is lacking and condition information and activities does not exist. Organizing functions are done on an individual "supervisor by supervisor" basis for

distribution and estimating resource requirements is limited. Mosquito Control and Vegetation management is performing many of the directing and controlling functions. Work is assigned daily and a service request process does exist and requests are tracked on an MS Excel spreadsheet. Work performed is compiled on various spreadsheets for mosquito control and vegetation uses an MS Access database for tracking work. Information is then compiled into a monthly summary report that is provided to the Director of Public Works. While Mosquito Control and Vegetation Management are performing some of the best management practices, these lack a continuous process for improvement. Figure 2-104 outlines the existing processes mosquito Control and vegetation management is performing.

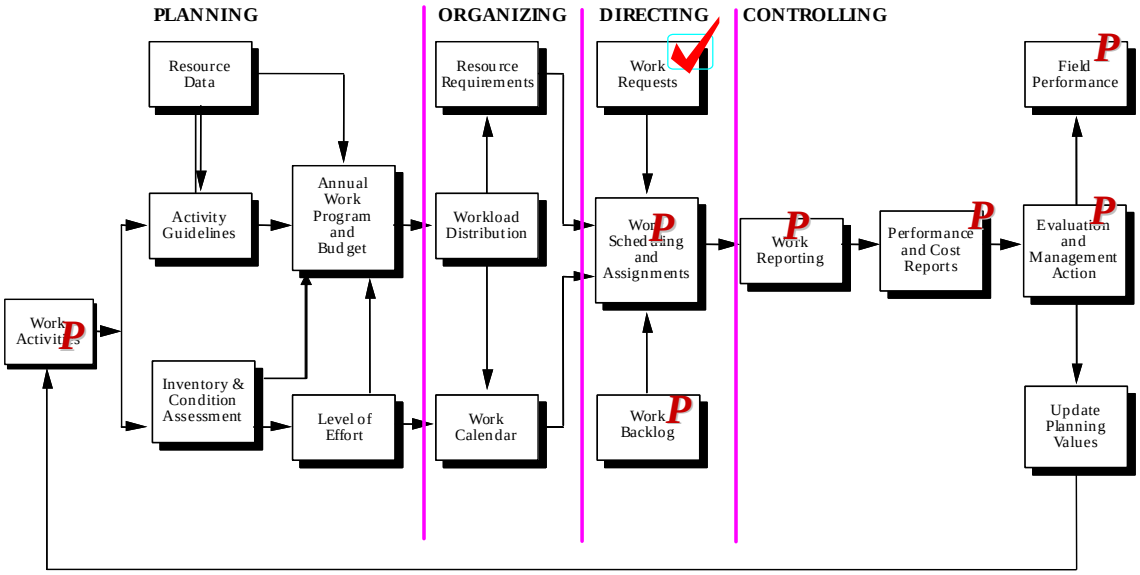

Figure 2-104 - Mosquito Control Work Management Process

Traffic Engineering

Traffic engineering is also performing a portion of best management practices as outlined in Figure 2-103. A complete list of activities has been identified for traffic signals, signs and markings, but they are lacking specific guidelines. Partial resource rates exist for labor and materials. A complete work program and budget is lacking but some routines and work activities are planned on an annual basis. Many of the organization functions and ability to determine resource annual requirements is lacking as is done on a "case by case" basis. A complete service request system exists and is tracked in both MS Excel and Primavera. Weekly, traffic sign schedules work and have specific zone assignments. Traffic Signals and Markings assign work at daily meeting. Work is then tracked in the P3 system including travel time, mileage, and work accomplishment. Information is then used for billing and monthly summary reports to the Director. Figure 2-105 outlines the existing processes Traffic Engineering is performing.

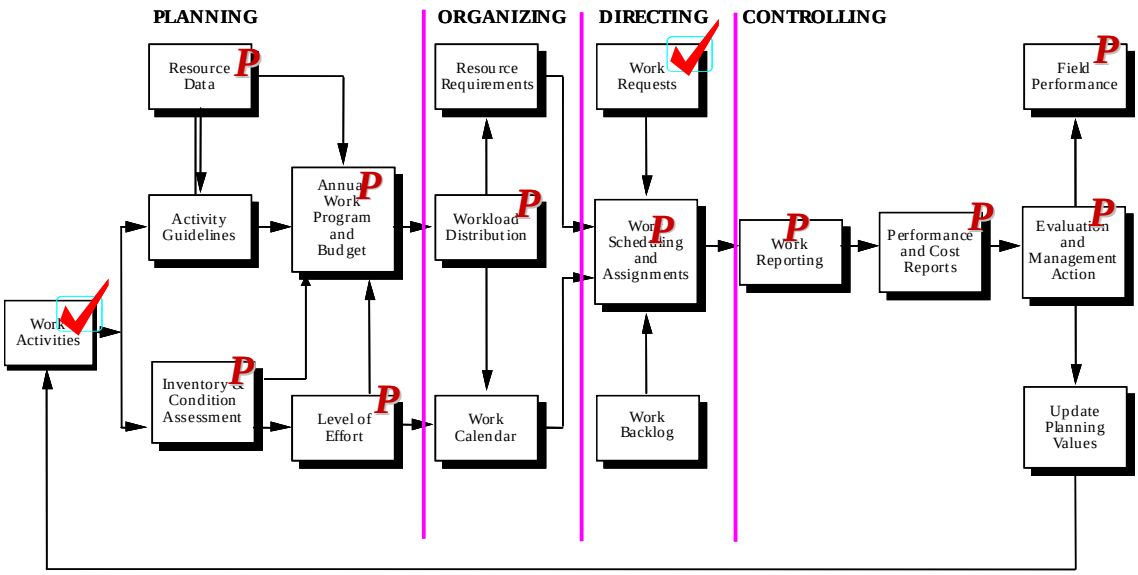

Figure 2-105 - Traffic Engineering Work Management Process

Solid Waste

Solid Waste is performing several of the management practices as outline in Figure 2-102. Figure 2-106 outlines the specific practices that Solid Waste is performing. A "*P*" indicates the process is being partially performed. A check indicates the process in being performed. Solid Waste is partially performing some of the planning practices. Resource information for material and labor exists and condition and life of the cells within the landfill exists on annual basis. A general plan for the major projects components exists. Organizing work and estimation of needed resources is done on managerial level. Solid Waste is performing some of the Directing work practices. A complete service request system exists for internal request in TIS. In addition a web based service request system exists for work that is contracted out through Solid Waste Management for residential trash collection. Work at the landfill and transfer stations is scheduled but varies by supervisors. In general supervisors meet daily with some supervisor developing weekly schedules to ensure complete coverage. The majority of controlling functions are being partially performed. Hauling information and cubic yards of material used for covering the landfill is tracked. This information is summarized in MS Excel spreadsheets. A summary report is provided to the Director of Public Works Monthly.

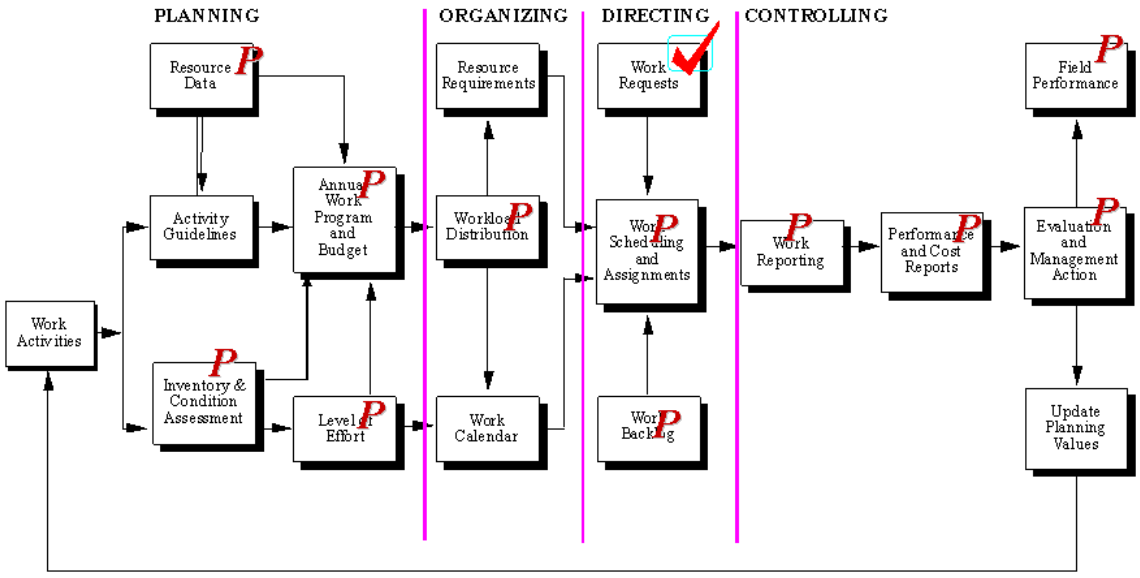

Figure 2-106 - Solid Waste Work Management Process

Water Operations and Utilities

Water Operations and Utilities are performing some of the best management practices as outlined in Figure 2-102. Figure 2-107 outlines the practices water operations and utilities are currently performing some of the planning practices. General activities exist in the AllMax system but are mainly related to the collection and distribution efforts but do not address all plant functions. Inventory condition through SCADA monitoring exists for some assets as well as water quality testing. This information has not been used to develop activity guideline or link to a work program and budget.

Water and Utility Operations is lack in the organizing process with no workload distribution or resources requirements being estimated except on a case by case basis. Many of the Directing functions are being performed to some extent. The AllMax system exists to monitor work and scheduling is done on a daily basis along with routine activities performed at many of the plants. AllMax is also used to perform controlling functions but obtaining some management information is difficult. Labor used to perform a work order can be monitored. In addition there are multiple MS Excel spreadsheets that are compiled in-house and required by the state that can be used to monitor work and ensure it is being performed effectively. Water and Utility Operations is performing some of these management practices but lacks both continuous and linked systematic process.

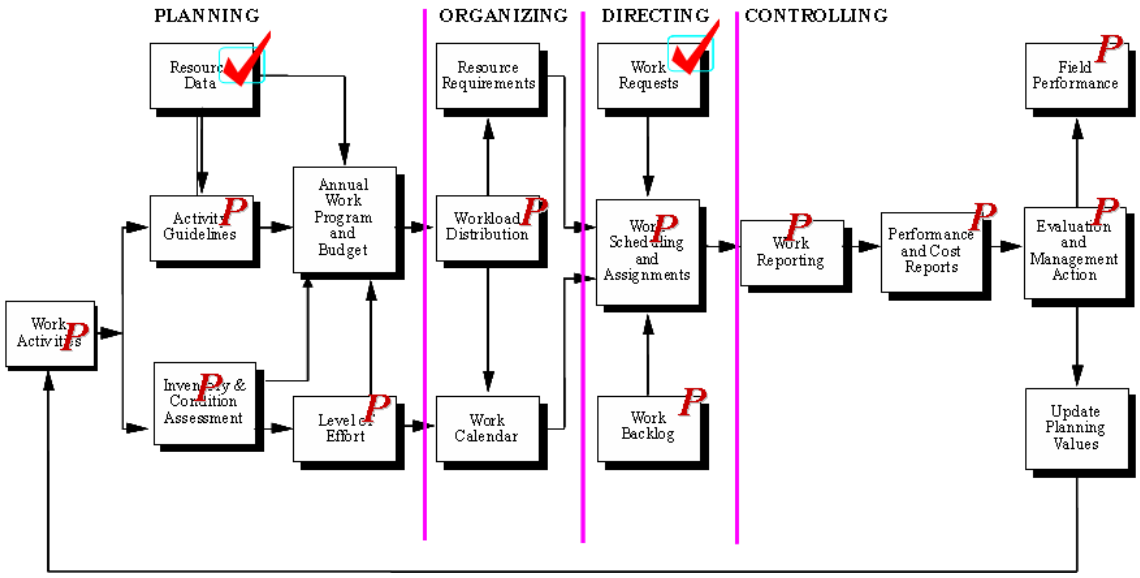

Figure 2-107 - Water Operations and Utilities Work Management Process

Construction Engineering

Construction Engineering is performing many of the management practices as outlined in Figure 2-102 with one overall system. The processes currently being performed by Construction engineering are outlined in Figure 2-108. Construction Engineering has developed an annual plan that is based on project. Activity guidelines are not appropriate (N/A) for most work that is being done. A condition assessment is used for pavement surface for selection of rehabilitation projects.

While the plan has many positive components it does not have a direct linkage to projection resources and service levels to meet the plan. Construction engineering is currently not systematically distributing workload by month and estimating annual resource needs to perform work but does perform on a point in time basis for key projects. Work scheduling and directing is partially being performed. Work is being tracked in MS Excel and though an MS Access database. The information tracked is used to review project status and information is summarized for the Director of Public Works monthly. While Construction Engineering is performing many of the management practices it lack a continuous process for improvement.

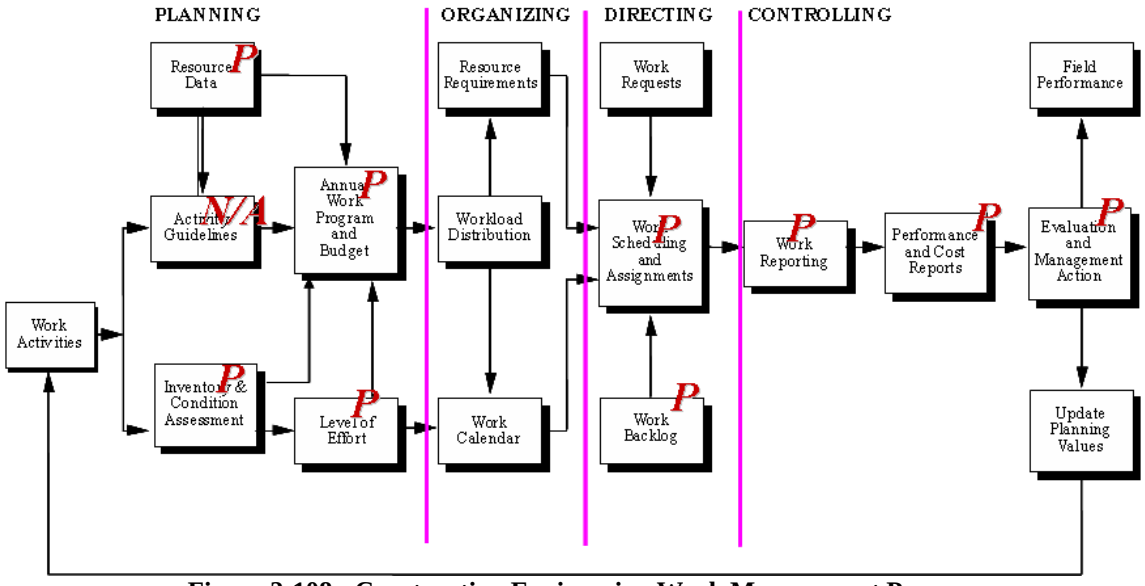

Figure 2-108 - Construction Engineering Work Management Process

3 – Findings

SECTION 3
FINDINGS

This section provides support information and analysis on opportunities to improve the existing maintenance operations. This section also includes research and analysis identifying findings that will provide a basis for specific recommendations. It is structured to follow the fundamental management functions: planning, organizing, directing and controlling/improving. By categorizing the findings under each function, management can approach the issues in a systematic manner.

The evaluation of efficiency involves two areas. First is the identification of opportunities in which the work function could be done in a more efficient manner. Second is the determination of the processes that would establish methods for continual improvement to meet the needs of a growing infrastructure system within Public Works. Using the base information generated along with field observations and maintenance expertise, LAC evaluated the Public Works Department from several points of view.

LAC's findings are supported from observations, interviews, data collection, comparisons, prior knowledge and evaluation. The one-hundred and fifty- six (156) findings are classified into five categories – general, planning, organizing, scheduling and controlling and improving. The findings are *not* presented in order of importance but sequence; however, many of the findings are related and should be reviewed in total and not just each one independently. It should be noted that much of the support information used to determine the findings derives mainly from baseline data in Section 2.

General

1. County has implemented many innovative ideas and is receptive to change if staff believes that it allows for improvement.

As indicated in Section 2 the County is performing many innovative ideas. The County's willingness and ability to implement these ideas along with performing the operations review clearly demonstrates the ability to change and improve their operations.

These ideas have promoted change that has allowed opportunities for improvement to be implemented. The existing ideas along with future opportunities and continuous re-visiting of ideas can allow for not only existing but future cost savings throughout the Public Works Department.

2. Race week, Biketoberfest, Bike Week and other special events have a major impact on workload.

The County has many major events that occur throughout the year including Biketoberfest and Bike Week. These events are ongoing during 10-15% of all employee work days. During special events the population (adding visitors) of the County increases dramatically, sometimes as much as 150%, which often results in an increased service level for many activities performed. Activities such as traffic control and litter pickup must be expanded. In addition, the amount of

visitor traffic can impact the ability to perform work in specific areas as well as travel time throughout the County.

It is difficult to determine the exact amount of resources spent on these events by all Public Works' divisions, because certain impacts, such as increased travel time, can not be readily determined without a complete tracking system. Public Works as a department does not track time spent on these specific events as a whole. Using activity and the events data that occur throughout the year, it is estimated that as much as 10 - 20% of the County's resources are expended on some aspects of these events. Significant effort is expended performing this related work. The accounting of work and costs related to these events are lacking in the current systems.

3. **Growth is greater than the national average and requires new resources to meet expectations. Largest growth is in the southwest. Specific areas of the County are under intense growth pressure with many new assets being completed and more suburban demands of new residents.**

The national population growth rate from 1990 to 2000 was 1.3% with the growth rate of 1.96% for Volusia County exceeding that value. An increase in population causes an increase in not only infrastructure assets but service as well. As more people and families live, work and travel in the County, the related needs for maintenance and operations for roads, signals and signs as well as the need for trash collection, landfill services and mosquito control services will increase.

The largest population growth has been in the southwest which has historically been an undeveloped area, yet now has the County's largest incorporated area - the City of Deltona. This area is having many new and improved asset features being added to the County system. Other areas such as Daytona are not experiencing as great a growth yet still require the needs of a more urban/suburban environment. This results in greater work effort in that area.

4. **The County is transitioning from a rural to more of an urban/suburban area with changing demands on work effort.**

While the population of the County grows, service levels have begun to change at even a higher rate. LAC has observed a service level in many instances where the County is transitioning from a traditionally more rural work environment to a semi urban/suburban environment. For instance, only 10 years ago many roadways were unpaved and/or narrow roadways used by small farms with swale ditches and related grassed shoulders that were mowed only a couple of times per year. Now these same facilities are multi-lane roadways with underground piping systems, traffic signals and large retention basins. Further, new Florida residents who have migrated from more urban areas are not familiar with this semitropical environment and desire road rights of way that are landscaped, little standing water and a low grass height similar to urban areas from which they migrated.

A rural environment will have a lower service level and different assets, which may consist of less frequent mowing cycles, more dirt roads and less traffic signals. As the County transitions to an urban/suburban environment, the work demands will change even more than only the growth of number of facilities and population. The customers are expecting increased mowing cycles,

wider paved roads, increased traffic control and less tolerance for litter in the County right of way. These changing demands require a different work effort and quality.

5. Travel time to work site within the County from yards often exceeds an hour.

The time to travel within the County is significant. A combination of distance, road network and quantity of traffic within the County can result in travel times between yards as well as to the job site to exceed one hour. Travel time can increase further during peak times due to traffic conditions. During some special events, many major roadways are at capacity making travel most difficult. This is significant in that travel time reduces the actual time spent at the work site. This factor can have a direct effect on productivity, accomplishment and overall cost. LAC estimates as much as 15 - 25% of all work time is travel.

6. Heavy equipment such as graders and loaders, along with materials, are normally staged directly from the Barns, with one way travel time to related work sites as much as an hour.

Road and Bridges stage heavy equipment along with materials from the four road barns. As mentioned in Finding 5, travel time to a job site can exceed one hour. Transporting the heavy equipment (i.e. loaders, graders and excavators) and materials (i.e. sod, concrete, etc.) may increase travel time to a job site even more. This is significant in that travel time reduces the actual time spent at the work site. This factor can have a direct affect on productivity, accomplishment and overall cost.

7. Several crews report to a yard and obtain transportation and then travel to another yard while some report directly to the job site.

It was observed in several variations where crews initially report to one yard (barn) obtain County transportation then travel to another yard for assignment. Most employees for Road and Bridges generally stage from the specific barn they are assigned with the assigned yard being where they obtain equipment and job assignments prior to traveling to the job site. One exception is the Bridge Tenders that report directly to the assigned bridge. In addition, there are several geographic crews including trees, shoulders and canal/drainage crews that stage out of the 44 Barn but travel to work sites throughout the County. The inmate supervisors report directly to the jail to pick up inmates.

Mosquito Control employees report to the New Smyrna Beach or Daytona field office. Work that is performed is generally performed throughout the County. The midge crew reports to the Daytona Beach office daily yet travels up to 45 minutes one way to Lake Monroe.

Water Resources and Utilities employees generally stage out of a regional plant or the operations office which includes operations administration and the water distribution/waste water collections maintenance crews. In some instances, employees report to smaller plants including the Halifax and Spruce Creek plants. Most employees report to the plant that will be the one they work at although they may travel to a remote plant to perform maintenance or monitoring activities. Some employees report to the Spruce Creek Plant to retrieve a County vehicle and

then report to the 44 Barn for work. Utility billing and engineering report to the main administrative offices in DeLand.

Traffic Engineering has two locations: the administrative office in DeLand and the Holly Hill Yard. The administrative, engineering and planning staff report directly to the administrative office. The several traffic signal employees assigned at the Holly Hill Yard report to the 44 Yard in DeLand in the morning to immediately affirm the existence of any emergencies. These employees then travel to the Holly Hill Yard to receive assignments, obtain materials and discuss specific assignments with supervisors.

Solid waste employees report to the Transfer Station or the Tomoka Landfill. In general the location an employee reports to is where they will be working for the day if they are not hauling. As is to be expected, haul truck drivers travel between the transfer station and the landfill frequently.

8. One way travel distance of 17 miles exists for Solid Waste between transfer station and landfill with an average of 3-4 trips per day per truck at 17 tons per load.

The transfer hauling data from the County's system indicated an average of 3-4 trips per day were hauled during the week Monday thru Friday. Table 3-1 provides the total trips and tons hauled per haul truck over a year time frame for calendar year 2006 along with the average number of trips. Further the data indicated that averages of 17 tons per truck were hauled each weekday.

The haul data for Saturday was reviewed separately. On Saturday's during calendar year 2006 the data indicated that an average of 1-2 trips per haul truck were made with an average of 6 tons hauled per trip (Table 3-2).

Table 3-1 Weekday Tonnage and Average Trips per Haul Truck

Vehicle ID	Trips	Tons	Avg Trips/Day
ZS	1	19	1.0
ZS148342	16	95	2.3
ZS148343	35	339	2.3
ZS154315	833	13,135	3.8
ZS154316	818	14,507	4.2
ZS154317	712	11,936	3.9
ZS154318	481	8,278	3.3
ZS156983	797	12,767	3.5
ZS156984	952	16,239	4.0
ZS156985	791	13,826	3.7
ZS156986	765	12,760	3.5
ZS163128	1,395	24,755	5.6
ZS164567	926	16,186	4.1
ZS164568	968	16,107	3.9
ZS164569	948	16,856	4.2
	10,438	177,805	

Table 3-2 Saturday Tonnage and Average Trips per Haul Truck

Vehicle ID	Trips	Tons	Avg Trips/Day
ZS148342	6	19	2.0
ZS148343	9	61	2.3
ZS154315	46	692	1.4
ZS154316	32	557	1.1
ZS154317	36	579	1.1
ZS154318	18	336	1.2
ZS156983	38	542	1.1
ZS156984	43	701	1.1
ZS156985	36	639	1.2
ZS156986	36	590	1.2
ZS163128	44	799	1.2
ZS164567	27	446	1.1
ZS164568	38	596	1.2
ZS164569	50	919	1.3
	459	7,477	

9. Haul distances of cover dirt are increasing due to location of borrow sites further from cells.

The haul distances for cover dirt are increasing with borrow sites selected being further from cells. This can impact productivity as it will take longer to perform the same amount of work. Secondly, prior to the closing of the landfill during the evening, dirt is stockpiled at the cell until the last vehicle has left the site.

In some cases the personnel hauling the cover dirt will have left for the evening prior to the last customer vehicle leaving the landfill. This can create a problem if the amount of dirt stockpiled is not sufficient to cover the cells. The available personnel will then have to haul additional dirt often on an overtime basis.

A cover tarp exists for use in cover but was not observed at this time to be used.

10. Analysis indicates that all County users of both Landfill and Transfer Station are bearing the burden to operate the transfer station.

Using a standard *break-even point* analysis[1] a trade-off analysis was made between the costs of the transfer station versus the cost to have commercial vehicles haul waste directly to the landfill. The pink line with a square in Figure 3-1 is the cost of the transfer station per ton per minute to the County. The dark blue line with a diamond is the cost to commercial vehicles to haul directly to the landfill. Conservatively direct haul vehicle operations were estimated by commercial truck and each were assumed to make two trips for every one trip that would have been made by a County transfer haul truck. The point where the two lines meet is the break even point or the

[1] Tchobanoglous and et. al. **Solid Waste Engineering Principles and Management Issues.** Mc-Graw Hill, NY, NY, 1977.

point where it is the same cost per ton per minute for the County to operate the transfer station as it is for the commercial direct haul units to travel to the landfill. If the break even point is greater than the current transfer station round trip travel time then the County is bearing most of the burden to operate the transfer station (per ton per minute) rather than the commercial haul units. This analysis indicates that the County should consider if a transfer station is warranted.

There may be other non economic reasons that determine the location and existence of a transfer station than the break even analysis such as community desires and industry needs.

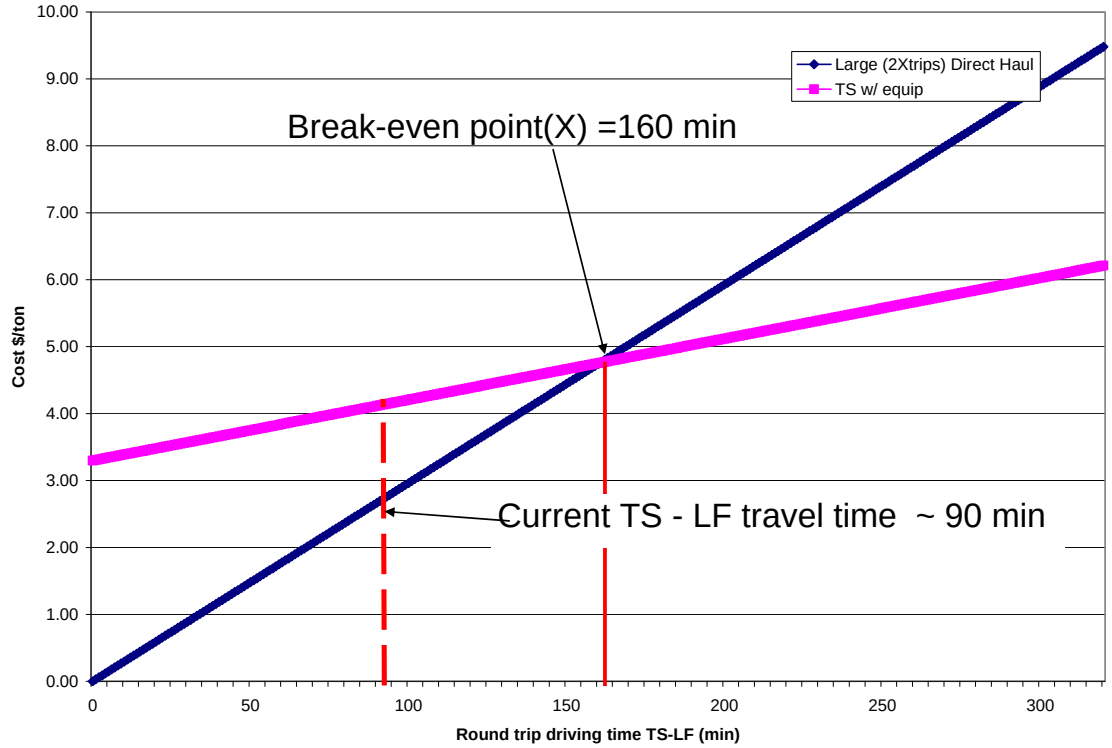

Figure 3-1 - *Break Even Point* Analysis for Transfer Station Location

11. The transfer station processes the least amount of vehicles and tonnage on Saturdays.

The total tonnage processed by day of the week for calendar year 2006 was reviewed. Only 4% of the tonnage that was received was on Saturday as outlined in Table 3-3. Thursday and Friday processed the most tonnage with 23% and 21%. The remaining weekdays processed a range of 16% to 19% which exceeded Saturday tonnage percentage by 300%.

Table 3-3 - Transfer Tonnage by Day of the Week

	Vehicle Processed	Total Tonnage	% of Total Tons
Monday	1,901	31,051	17%
Tuesday	1,840	30,428	16%
Wednesday	2,081	35,776	19%
Thursday	2,399	42,136	23%
Friday	2,217	38,415	21%
Saturday	459	7,477	4%
Total	10,897	185,282	

12. Mosquito Control tax district is on the east side of the County yet much of their work is done for others outside of the District's responsibilities.

The Mosquito Control District boundaries are located on the east side of Volusia County. However, over 45% of work is performed outside of the District's boundaries for others. This was estimated (in 2005) from budget line item codes 3438, 3771, 4491 and 6221 which equate to $1.02 million in work costs. This includes work for school boards, city contracts and work on the west side of the County as well as Stormwater support. Some work that is done for others is within District Boundaries which may not be for Mosquito Control. Further, observation and interviews with crews as well as work tracking indicate that a significant portion of Mosquito Control's work is outside of eastside official boundaries.

13. The two Mosquito Control yards are on the east side of the County with varying acre and lease amounts.

Mosquito Control operates from two yards, both on the east side of the County. The Daytona Beach yard is located adjacent to the Daytona Airport and costs the County $75,000 per year for the lease of 3.5 acres. The other yard is in New Smyrna Beach located adjacent to the New Smyrna Beach Airport. The New Smyrna Beach yard costs the County $40,000 per year for the lease of 5 acres. Plans are being made to consolidate the yards with the Daytona Beach yard closed and all Mosquito Control employees to report to the New Smyrna Beach yard.

14. County has many employees (13-14) on-call after hours with pay allocated at 4 hours per week with a 2-hour minimum call out.

The County has employees in every group that are on standby for after hours support except Solid Waste and Mosquito Control. The standby employees all receive four hours of pay weekly for that responsibility. The personnel that are "on-call" take County vehicles home to allow for quicker response. The "on-call" staff takes requests or emergency calls and analyzes the problem and makes judgment of the needed resources. They may respond to the issue directly or contact other County staff to respond or assist them. All employees responding are paid two hours minimum overtime pay if they have worked more than forty hours that week. The breakdown by group is as follows:

- Traffic Signals – one staff member on weekly basis is rotated on "on-call" for the slower season for six months and two staff rotates during other six months of the year.
- Traffic Signs - two sign technicians are on-call with one on the east side and one on the west side of the County during peak season and only one during the slower six months of the season on the Westside.
- Utility Operations - four staff members are assigned on-call and divided - one on the east side of the County, one on the west side of the County, a water staff person and one supervisor.
- Road & Bridge - two people are on-call for the road response and rotate the assignment on a monthly basis.

Mosquito Control has no personnel on-call, but they do have an emergency contact list and a supervisor will respond as required. Solid Waste also has no on-call staff but have an emergency contact list.

15. Many systems and databases (63) are used by Public Works for tracking and documenting work and assets.

The various Public Works divisions utilize a combination of automated databases. Sixty three major systems and databases were identified that are used for work tracking including databases, systems, spreadsheets, work documents and manual forms. These multiple independent databases for maintenance and operations were developed by both internal and external developers.

Major systems and databases utilized include the TIS system used by Road and Bridges and Solid Waste. TIS was developed in-house on a mainframe system. Utility Operations utilizes the AllMax system for work orders, the Tokay system for managing backflow devices and SCADA for monitoring systems. Traffic Engineering utilizes P3, construction engineering utilizes an in-house MS Access database and Mosquito Control utilizes three systems - P3, MS Excel and an in-house developed MS Access system.

County staff has varied capabilities for the retrieval of data from these systems. Further, because the databases are not integrated and lack similar indices or data references, the data retrieval process from multiple databases is difficult and can often only be done with a manual compilation.

16. Tracking of travel via both a manual log and a GPS tracking system may result in some duplication of effort.

The County currently utilizes global positioning system (GPS) tracking in many of its vehicles integrated with a web site for monitoring and reviewing history with a plan for implementation for all vehicles. In addition to this GPS tracking, County employees track their travel on a manual log which includes similar information as available on the GPS. The manual log contains location information throughout the day. This information is also available through GPS tracking with much greater accuracy. The manual log takes additional time to complete daily and work must be stopped and the form completed. In some cases the form will be matched to the GPS information. This will take additional time and effort to perform. The information appears to be a duplicate effort in the vehicles that have GPS devices.

17. County utilizes specialized applications and technology including GPS and biometric timekeeping for accountability purposes.

The County is utilizing some of the latest technology for work tracking and timekeeping. The County is in the process of implementing a GPS tracking system on all vehicles. GPS uses satellite technology to locate the position of the vehicles and can ensure that County vehicles are engaged in County business. The County also utilizes a biometric timekeeping system, Kronos. Kronos uses finger print scanning for time clock purposes. This is technology that LAC has observed in only a few other public works operations.

18. Telemetry systems exist at many locations yet some facilities have limited and/or no use of this remote monitoring and access technology.

The County has two separate telemetry systems that are used for remote monitoring: Wonderware and Dataflow. Wonderware is a satellite monitoring system and Dataflow is a SCADA system. According to the table below there are 7,178 telemetry points monitored throughout the County (Table 3-4). Most of the 107 lift stations and the 11 water treatment plants have SCADA capabilities and only some of the 15 wastewater treatment plants have SCADA monitoring capabilities. The ability to control processes is limited with most abilities related to monitoring operations and alarms.

There are nine lift stations on the east side without monitoring capabilities and ten on the west side without monitoring capabilities. While many do have monitoring capabilities, the system makes many "ghost calls" that must be manually confirmed or turned off although they are not as a result of plant failure but are the cause of electrical disruption from lighting storms or non-related to the operation of the plant. The County provided a sheet containing a weeks worth of alarms in the Dataflow SCADA system. Many of them required no other action then to be cleared. This can impact productivity of crews that are checking alarms rather than performing work.

Table 3-4- SCADA Points by Area

	Eastside	Westside
Radios Monitored	39	80
Telemety Points	2237	4941

19. Fleet has a good information system that provides management information but there is lack of understanding of capabilities and usage by PW.

The Fleet Division utilizes the Faster Fleet System and Fuel Boy system for monitoring maintenance and operations expenses for the County's fleet including repair and fuel costs. The system allows for retrieval of data. Other than one senior manager, none of the staff had understanding of the system capabilities and /or potential usage.

Information in the system is not currently being used on a regular basis by the Public Works Department to perform key functions such as life cycle costing or calculating fleet rates. Each division within Public Works is responsible for managing their own fleet capital replacement costs and tracking equipment usage in their independent manner though their work tracking systems. Without determining all costs - repair, maintenance, fuel and capital costs, life cycle costing is difficult to evaluate. In addition, this information can also be used to calculate hourly equipment rates. Current equipment rates vary by division for similar type of equipment and are estimated. Further, even those values that are estimated are infrequently updated.

Planning

20. Utility assets are small in size compared to larger utilities and cities yet they are comprehensive for water and sewer with all four functions (water and wastewater treatment, distribution and collection) and are distributed throughout the County.

The County's utility assets vary in size and are small in size as the population is distributed. In many instances assets are located a significant travel distance from the utility staging locations and service a small number of customers. When comparing an agency such as Volusia to other larger or City utility agencies the size of assets, population served and service area must be considered.

Many city utilities for example have a higher concentration of customers and assets. Maintaining assets in Volusia County will not have the economies of scale that other agencies experience, yet the County will have the same mandates from state and environmental agencies on quality, safety and often staffing levels.

However, the County does maintain a wide variety of assets for utilities including assets for each of the four main utility functions - water treatment, waste water treatment, water distribution and waste water collections. The combination of amount, size and service area of theses assets require a variety of different resource types and labor skills to maintain, which make it difficult for the County to be cost efficient.

21. Many small plants exist that require support resources and travel that exceed general average mandated or business practices effort. Many of the small plants were acquired by the County as result of plant abandonment of private facilities.

The County is responsible for small package plants that are often located in remote sections of the County. These plants were abandoned by private facilities including small developments. The County is mandated by state statues to take over maintenance of these facilities if the utility can not be maintained with private financial support.

The results of this, including recent additions of the Stone Island and Meadowlea plants, has been an impact on resources as these plants service only a small number of customers. The travel time to these plants can exceed average mandated on-site requirements and related business practices effort. This is problematic in the event of an emergency when the operator will have to travel from their existing location to the site to resolve the issue.

22. The dual access to reclaimed water and domestic water provided to residences requires time for backflow devices to be installed and tested. Further, reclaimed water use is growing.

The County currently is allowing residences access to both domestic and reclaimed water. This has many positive environmental impacts including allowing reclaimed water to be used for non potable purposes such as to water lawns or other landscaping areas without wasting drinking water. While reclaimed water use has positive environmental impacts it does impact the workload of utility operations.

Each home with dual use of reclaimed and domestic water must have a backflow device installed to prevent the contamination of the domestic water by the reclaimed water. Each installation must be inspected and tested. As the use of reclaimed water grows, the need for resources to

perform the testing and inspection of backflow devices will grow. The testing is mandated to be done annually and the resident devices are the purveyor's responsibility.

County records indicate a dramatic increase in reclaimed water accounts since 2001. The number of accounts has increased from only 128 in 2001 to 1,169 in 2006. An increase in the number of reclaimed accounts requires a proportionate increase in the number of backflow devices, which results in additional maintenance needs.

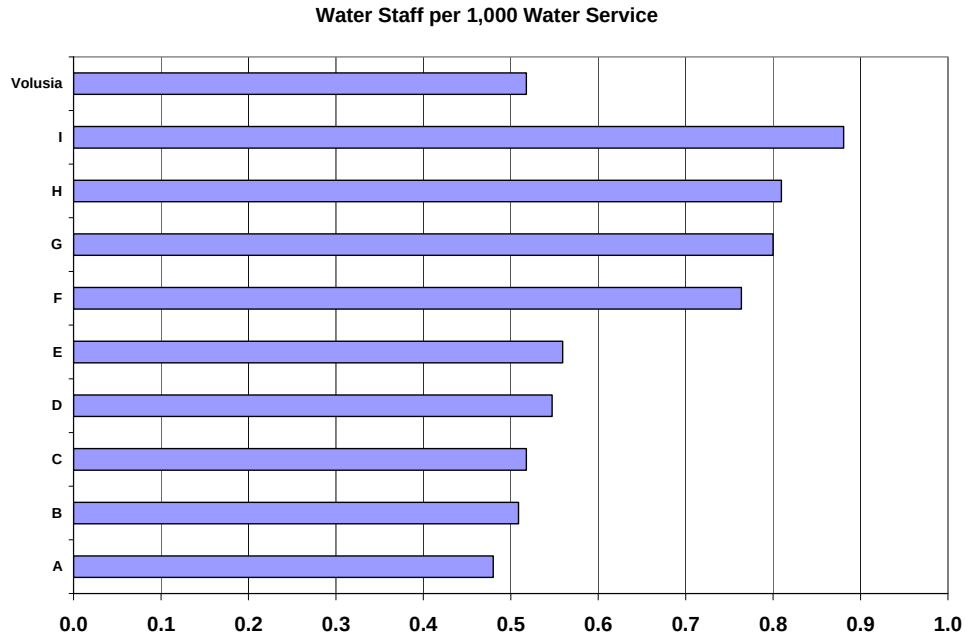

Figure 3-2 Staff per 1,000 Water Service

23. Distribution staff per water service is lower than the LAC database. This includes two contract meter readers and one Tradesworker from utility billing.

The number of distribution staff per water service for Volusia County is 0.5 employees, which is slightly lower than the LAC database average of 0.6 (Figure 3-2). This comparison is based on 15,447 services and 8 distribution staff, which includes 0.5 Supervisor III, 0.5 Tradesworker I, 3.5 Tradesworker II's, 0.5 Tradesworker III, 2 contract meter readers and one Tradesworker from utility billing. Partial employees were used in the calculations to account for the fact that the same utility employees perform duties in both water and wastewater operations. This rationale is used throughout this report for analysis involving staff with split duties.

24. County contract effort for meter reading is competitive and lower than LAC's benchmark data.

The County contracts all meter reading activity at a rate competitive with other agencies in LAC's database. Meter reading for the County is contracted at a rate of approximately $0.68 per meter read, which is lower than the average operating rate of $0.85 for comparable water/wastewater utility agencies and similar to other utility groups that perform meter reading

activities. Figure 3-3 compares the cost per meter read for several utility types as recorded in the manual for, *Meter Reading Profiles and Best Practices*, published by the Ascent Group in 2004.

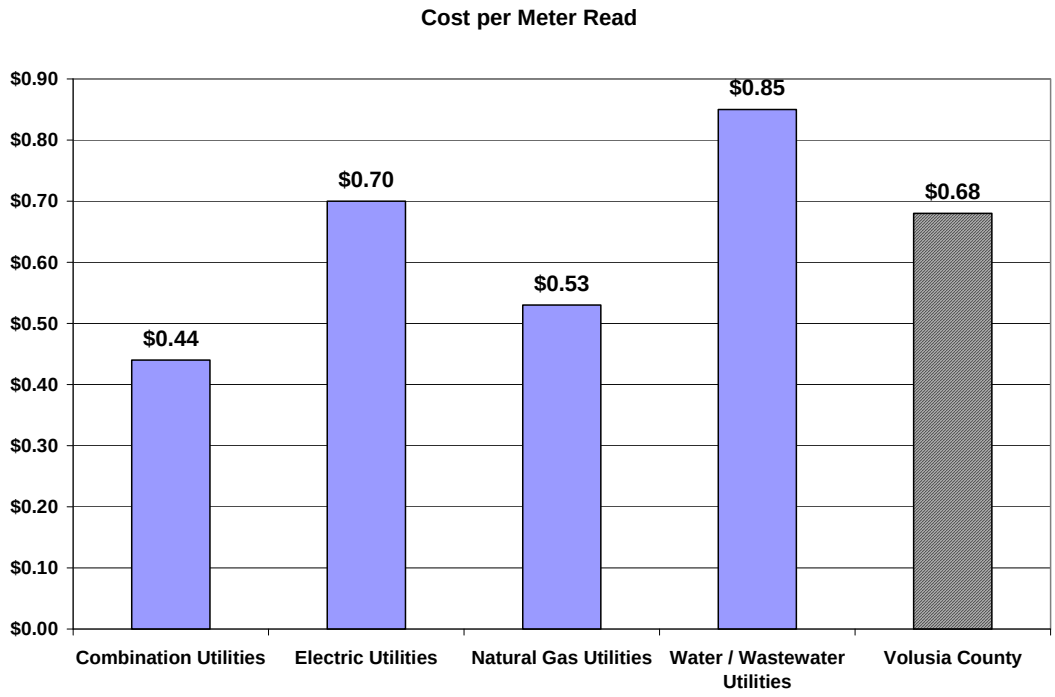

Figure 3-3 Meter Read Cost Comparison

This contract rate by the county is lower than other agencies in the LAC database for Florida in-house agencies. This contracting effort appears most cost effective for this labor intensive activity.

Automated meter reading (AMR) technology however does exist to monitor and read water meters remotely using telemetry. Many agencies are now converting to this technology which results in reads that could cost less than $.10 per meter read; however, each meter costs ~ $150 to install with a 6-7 year payback.

25. Water production exceeded population growth prior to 2000, but has stabilized in recent years.

During 1996 to 2000, water production in the County increased an average annual rate of 11% while the population grew at an average annual rate of only 1.9% during the same period. Since 2000, the water production growth rate has stabilized to less than 1% per year while the population has continued to increase at approximately 2.3% per year. Capacity was increased in the past and may have to be again as population growth is higher than production.

26. Volusia County water production of .23 MGD per FTE is similar to AWWA's average of .25 MGD per FTE.

Volusia County produces approximately .23 MGD of water for each water production personnel. This is similar to the American Water Works Association (AWWA) average of .25 MGD per water production staff. AWWA is an international nonprofit society dedicated to the improvement of water quality and supply and is the authoritative resource for knowledge, information and advocacy to improve water quality and supply. This indicates the County has similar staffing for water production compared to other agencies. LAC assumed the utilization of 0.5 Tradesworker III, 7.5 Plant Operators and 1.5 Plant Supervisors for water production and utilized the reported average daily production of 3.5 MGD in FY 2005 for the calculation.

This similarity may be explained since AWWA average includes many facilities that require treatment processes needing more onsite operators while County operations is mainly application of chlorine to water pumped directly from wells. However, it is relevant these ratios are similar to AWWA yet the County's operation is relatively small one that is spread over a wide service area.

27. Reported miles of water and sewer lines appear low as compared to LAC's benchmark data. If low, it reduces the ability to compare to other agencies.

The County reported 231 miles of water distribution lines and 185 miles of sewer collection lines in 2006. County staff confirmed based on CAD data files that are currently being entered into GIS which have some uncertain to the completeness of the inventory. This uncertainty of line miles reduces the ability to make meaningful comparisons to other agencies.

These numbers were used to compute the number of residents per mile of main line for both sewer and water. Other agencies in LAC's database reported an average of 216 residents per sewer mile while Volusia reports 692 (Figure 3-4). Volusia also reported 554 residents per water mile while other agencies reported an average of only 135 (Figure 3-5).

The unincorporated population of the County was used for this comparison. This does not include the population for Deltona and Debary, although the County does provide some service to these areas. If these populations were included, the numbers for population per sewer mile would be much greater for Volusia.

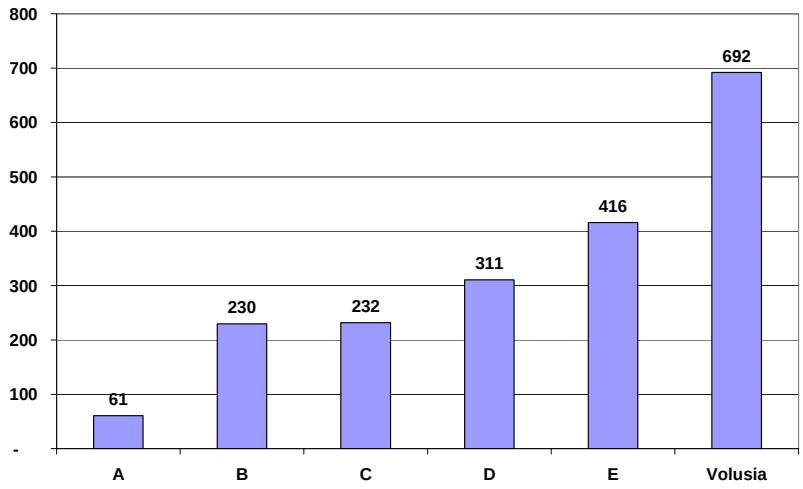

Figure 3-4 Population per sewer mile

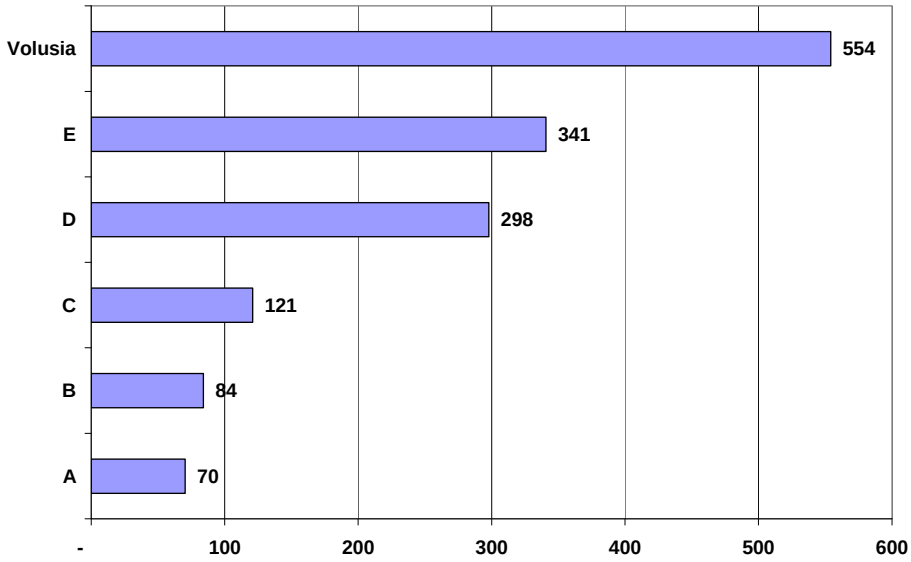

Figure 3-5 Population per water mile

28. Volusia County wastewater treatment productivity appears low yet staff is not high. The County treats .11 MGD per FTE which is half of production that AWWA reports for similar agencies (.22 MGD per FTE) yet using EPA's benchmark analysis indicates the County has a lower staffing for Wastewater than is estimated.

An average wastewater treatment volume of 1.8 MGD reported during FY 2005 and staff estimates of 1.5 Treatment Plant Supervisors, 10.5 Treatment Plant Operators, 2 Treatment Plant Operator Trainees and 1.5 Tradesworker III's for wastewater treatment were used to calculate the volume of wastewater treated per FTE. This includes all staff from the Westside wastewater treatment plants and half of the staff from the Eastside personnel which performs both water and wastewater treatment functions.

The average productivity of .11 MGD for each FTE is half of the AWWA benchmark among similar wastewater treatment operations. The relatively small MGD of many minor treatment plants coupled with mandated requirements impacted the County's productivity.

An analysis was performed following the performed following the *Estimating Staffing for Municipal Wastewater Treatment Facilities Operations and Maintenance Program*, from Environmental Protection Agency (EPA). Staffing needs for the treatment facilities were estimated on the three largest waste water treatment facilities including the SW regional, Deltona North and SE regional reclamation facilities. Based upon the analysis, 13.7 employees would be warranted to operate the three plants combined. Estimates of hours by category are provided in Table 3-5 along with the total FTEs.

Table 3-5 – EPA Staffing Analysis by Hours per Function

	Operation	Maintenance	Supervisory	Clerical	Laboratory	Total Hours	FTE's Needed
SW	6,837	2,211	580	65	388	10,081	5.73
Deltona	4,675	1,518	335	23	230	6,781	3.85
SE	4,962	1,600	370	28	253	7,213	4.10
Total Hours	16,474	5,329	1,285	116	871	24,075	13.68
FTE's needed	9.36	3.03	0.73	0.07	0.49	13.68	

The EPA analysis included night and weekend shift personnel needs without some of the latest technology such as SCADA which may further minimize staff needs as this technology can be utilized to monitor the plants remotely. The breakdown of day time, night time and weekend FTEs estimated in the EPA report is provided in Table 3-6. Since the night time and weekend staff may be slightly overstated, the range of employees needed for the three regional plants using the EPA analysis is between 9-13 employees. This range takes into account that each of the three plants need to be visited on the weekend but do not require full time staffing.

Table 3-6 – EPA Staffing Analysis by FTEs per Shift

	Day	Night	Weekend	Total FTE's
SW	3.2	1.1	1.4	5.7
Deltona	2.2	0.7	1.0	3.9
SE	2.3	0.8	1.0	4.1
Total FTE's	7.7	2.6	3.4	

Further, 1 - 2 additional employees beyond the three larger plants are required at a minimum for the support of the remaining small waste water facilities and waste water package plants based upon permit requirements.

29. Sewer collections staff per 100 mile of sewer line is low compared to LAC database. County system is relatively new and many traditional preventative programs are lacking.

The County utilizes 2.7 sewer collection employees per every 100 miles of sewer line. The staffing is based on values of 0.5 Supervisor III, 0.5 Tradesworker I, 3.5 Tradesworker II's and 0.5 Tradesworker III for wastewater collections. This value is lower than the LAC database average of 3.2 for similar agencies (Figure 3-6).

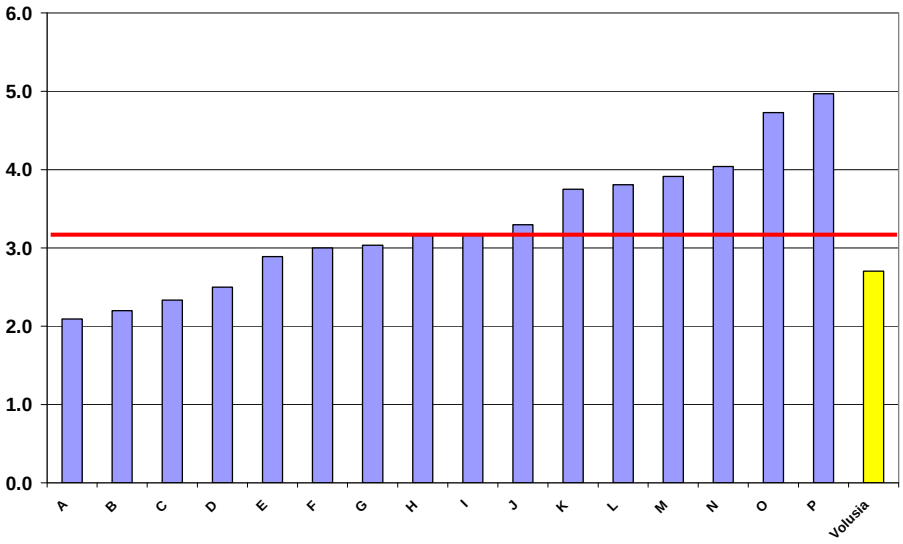

Figure 3-6 Sewer Staff per 100 Sewer Miles

The lower value indicates that County staffing appears to be lower than other agencies. The relatively young age of most sewer lines and the lack of a preventative program for sewer line cleaning and TV inspection may account for this.

30. Water distribution staff per mile of water lines is lower than LAC database. County system is relatively new and many traditional preventative programs are lacking.

Water distribution staff per mile of water line for the County is 3.5 employees (Figure 3-7). This is lower than the LAC database average of 4.4. LAC assumed the utilization of 0.5 Tradesworker I, 3.5 Tradesworker II's, 1 Tradesworker III, 2 contract meter readers, 1 trades worker and 0.5 Superintendent III for use in this analysis.

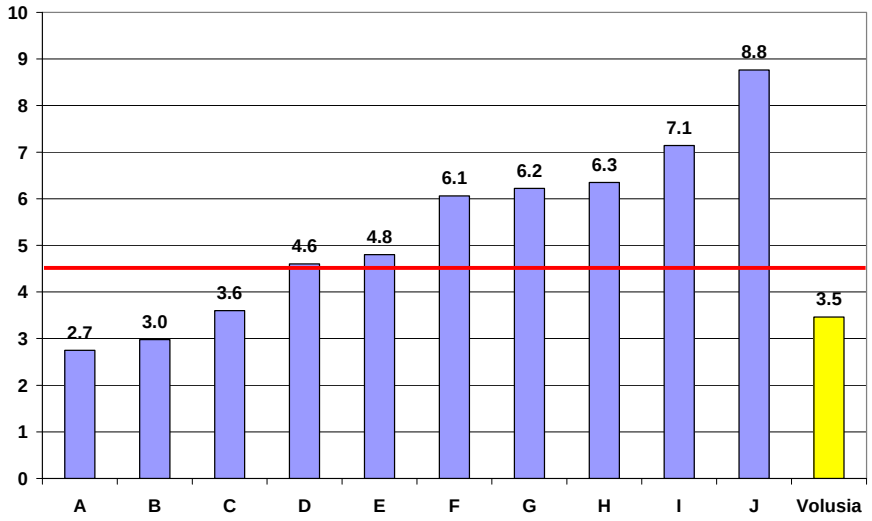

Figure 3-7 Water Staff per 100 Water Miles

The lower value indicates county staffing is less than most other agencies. The relatively young age of most water lines and the lack of preventative program for water line value turning and hydrant maintenance may explain the staffing needs.

31. Negative water loss in some areas. More water was metered than produced or purchased in Spruce Creek and SW interconnect service area.

Real water loss is defined by American Water Works Association and International Water Association as the annual volume lost through all types of leaks, breaks and overflows on mains, service reservoirs and service connections up to the point of customer metering. Water loss is the percent difference between the amounts of water produced/purchased and sold and is a measure of efficiency for water departments. Figure 3-8 indicates the 2005 water loss by treatment area. Since the water loss is a function of the water produced, it is unlikely to have negative water loss. This would indicate that more water was metered/lost then produced. The County had a negative water loss in two areas. The Spruce Creek treatment plant experienced a 16.2% water loss in 2005. At this plant the County treated or purchased ~81,000 gallons and metered or lost ~93,000 gallons.

The SW interconnect also experienced negative water loss but on a much smaller scale. The SW interconnects lost -0.9%, with 851,000 gallons produced and ~859,000 gallons used. The SW interconnects produced 61% of the total water production in the County and can have a significant impact on the total water loss.

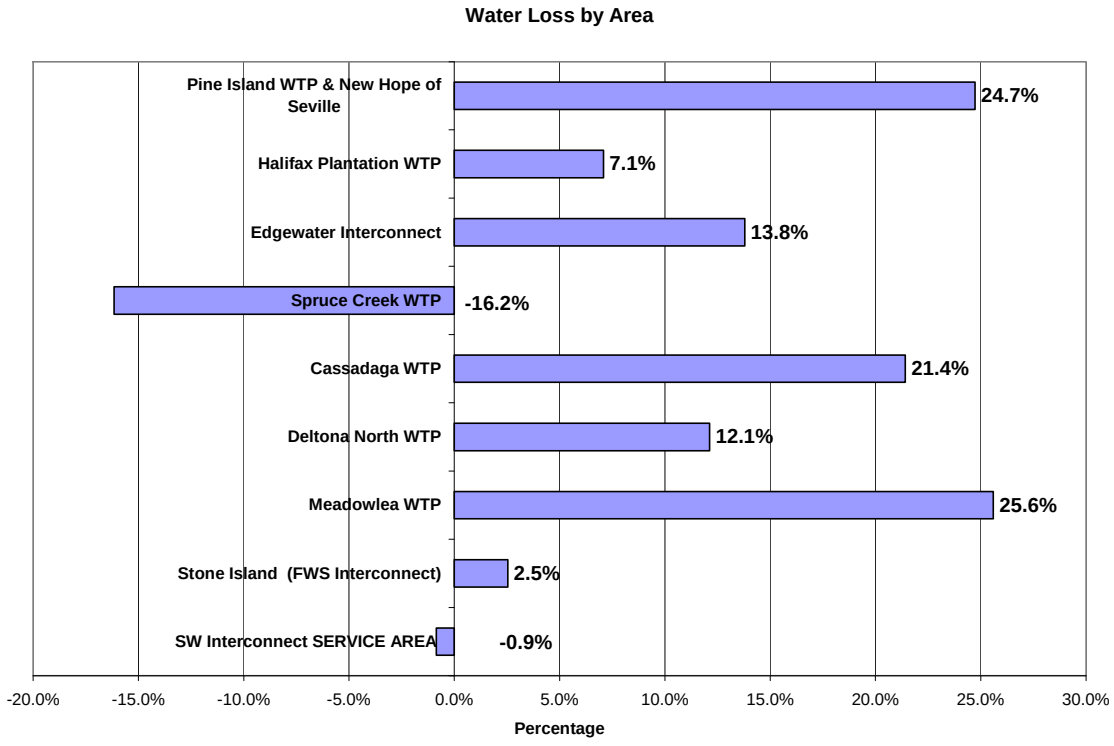

Figure 3-8 Water Loss by Plant

32. Water loss decreased 75% since FY2001 to 2.5% and is lower than the 9% average in LAC's database and AWWA average of 7%.

Evaluation of water loss information from the County for the years 2001-2005 was performed using water production and usage data collected by the County in its annual reports. A reported 1,276 million gallons of water in 2005 was used. The average water loss is computed at 2.4% which is lower than the average water loss of other agencies in LAC's database at 9% and the Qualserve benchmark at 7.1%. This is demonstrated in Figure 3-9 and 3-10.

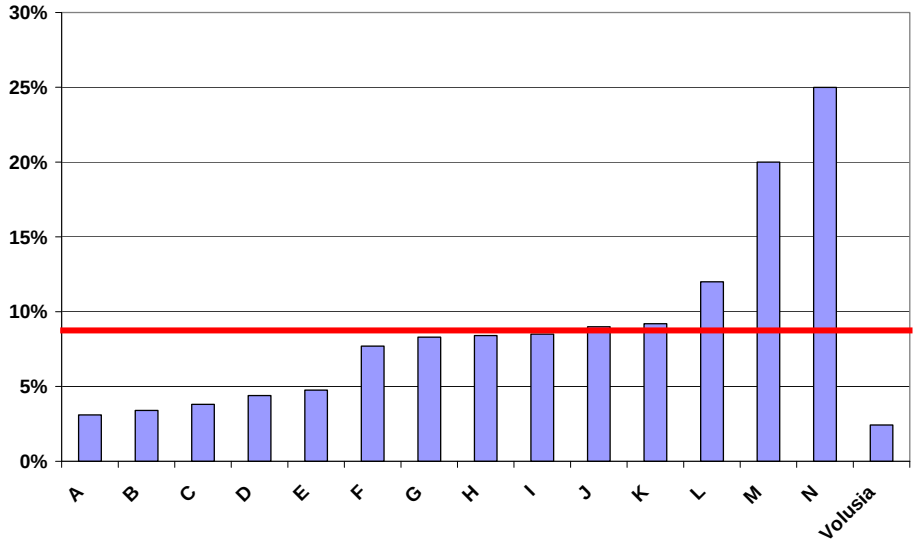

Figure 3-9 – Volusia Water Loss Compared to other Agencies in LAC's Database

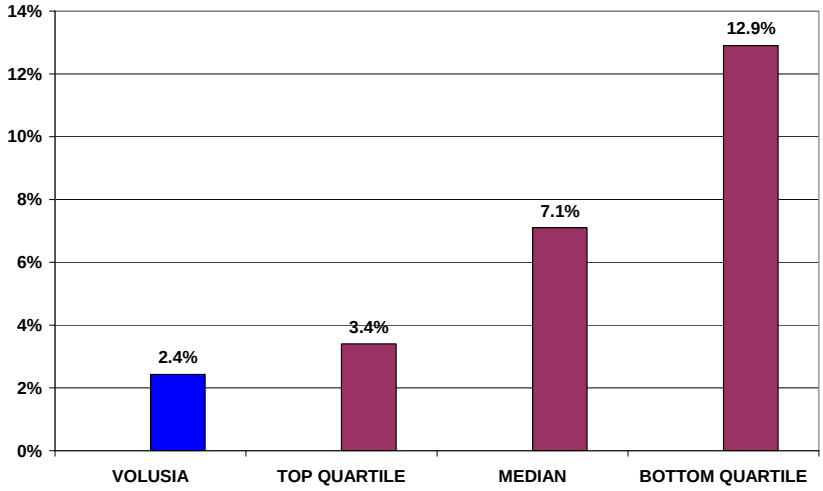

Figure 3-10 – Volusia Water Loss Compared to Qualserve Data

From 2001 to 2005, water loss decreased 75%. In 2001, there was an overall water loss of 9.8% which decreased to 2.5% in 2005 (Figure 3-11). These Figures may be impacted by the negative water loss at the SW interconnect which treats or purchased a majority of the County's water.

Some of the smaller plants, as indicated in the chart from Finding 29, actually have a water loss that exceeds the median water loss for AWWA including the Edgewater, Cassadaga, Deltona North and Meadowlea treatment areas.

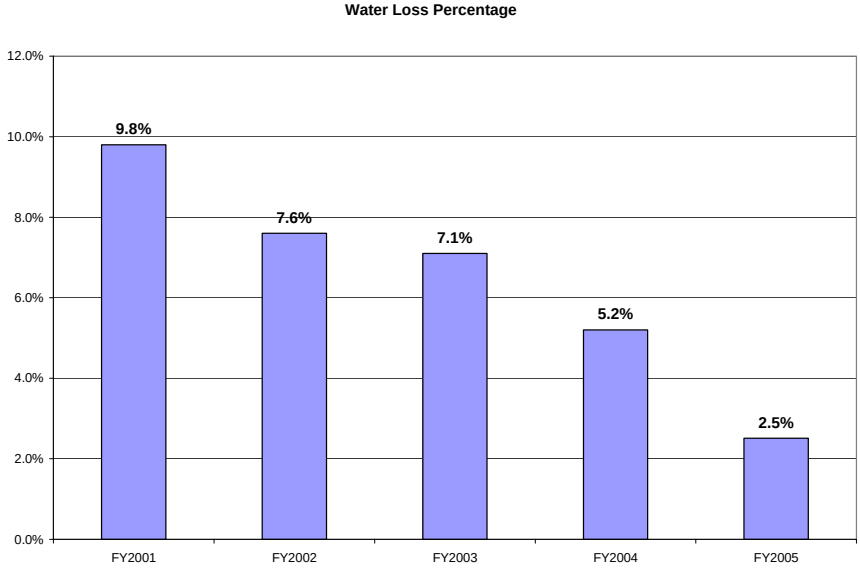

Figure 3-11 – Volusia Annual Water Loss by Year (2003-2005)

33. County rates in the area are competitive yet the County water rates increase with usage.

The rates for water consumption increase relative to water usage with a rate hike for each additional 7,000 gallons used. For example, the first 7,000 gallon of water used per customer costs $1.60. For 7,000 to 14,000 gallons of water used the rate per gallon is $1.83, 14,000 to 21,000 gallons cost $2.32 and above 21,000 gallons of water used cost $4.81. A rate increase determined by gallons used also occurs for irrigation and reclaimed water customers. This is a good practice as it discourages excessive water use by customers.

However, although rates increase with usage the rate charge per customer by gallon remain consistent throughout the County and do not change by service area. This can have a significant impact as service areas that are in remote locations or serviced by package plants may cost more to produce and treat water then the areas that are serviced by a regional plant. Many other agencies in the area still have constant rates.

34. The majority of customers are water.

The customer billing for 2006 by meter type indicates that there were 14,630 water meters billed, 10,553 sewer meters billed, 1,113 reclaimed meters, 538 irrigation and 209 inactive meters.

This indicates that most of the customers have water meters with some customers having additional meter types. Many water services are serviced for sewer by septic and or other sewer agencies. In addition, this data is a workload indicator and indicates that operations maintain a greater number of water assets than sewer assets.

35. One key benchmark measurement shows County staffing higher. Mosquito Control staff per 10,000 residents is higher than the average in LAC's database yet by excluding the ditch maintenance crew it is closer to the average.

Volusia County utilizes 0.93 mosquito control staff per 10,000 residents including the ditch cleaning crew and excluding the director and 3 commissioners (Figure 3-12). Comparisons were made against other Florida counties. LAC determined the .93 County average to be greater than the LAC database average of .48. This average was calculated by taking the entire population of the agencies and dividing by all mosquito control staff. Further analysis indicated none of the other benchmark agencies had a non-spray ditch cleaning function.

Excluding the ditch crew, the districts staff per population is 0.67 which is similar but above the LAC database average. Comparisons were made using all staff employed in the Volusia Mosquito Control division with the exception of the Mosquito Control Director, three Mosquito Control Commissioners and the ditch cleaning crews (Figure 3-13). Other agencies in LAC's database lack similar ditch crews in their MC operations.

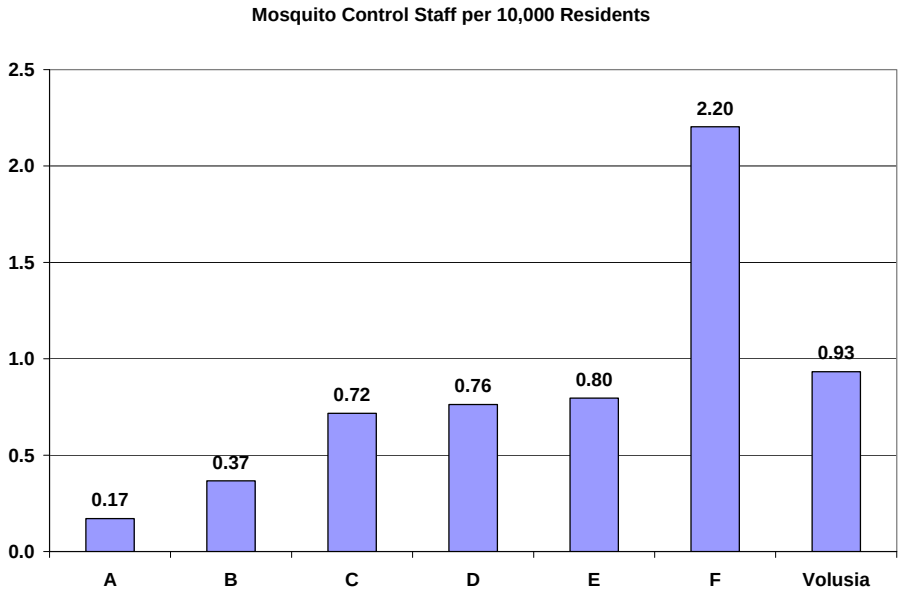

Figure 3-12 – Mosquito Control Staff per 10,000 Residents including Ditch Crew

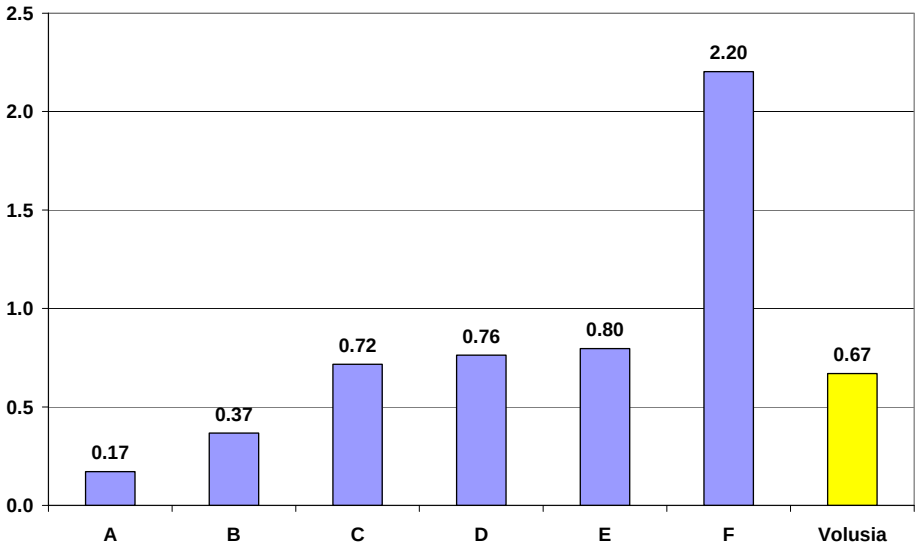

Figure 3-13 – Mosquito Control Staff per 10,000 Residents excluding Ditch Crew

36. Volusia County exceeds another benchmark value. Mosquito Control staff per 100 square miles of coverage is higher than average of LAC database.

Mosquito Control staff per 100 square miles of coverage area is higher than LAC database average of other Florida counties (Figure 3-14). Volusia County utilized 8.6 staff per 100 square miles, compared to an average of 5.9 for comparable counties. Coverage area for Volusia consists of the 537-square mile East side tax district as indicated by GIS shape files obtained from County staff. Ditch crews are used in this analysis.

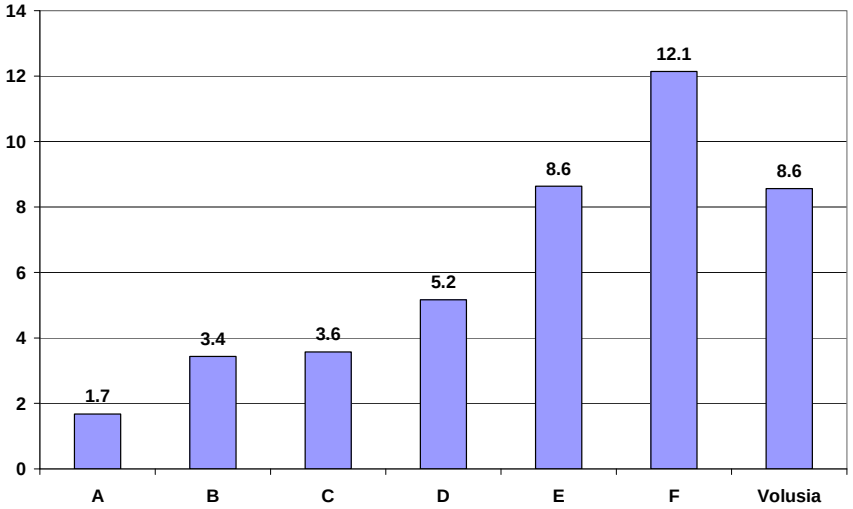

Figure 3-14 – Mosquito Control Staff per 100 Square Miles

37. Cost to purchase sign components is higher than signs purchased prefabricated.

The County cost to purchase of individual sign sheeting and sign blanks is more costly than purchase of sign prefabricated from the same County vendor. Using the County existing contracts the cost to buy sign fabricated is now cheaper in most cases. For example, for a high intensity regulatory signs for prefabricated signs cost is cheaper than buying the sign face and blanks components separately by $.18 per square foot so for a sign 24 " stop sign it would be over $1 cheaper not counting County labor cost! If you considered the cost for the County to fabricate the signs the saving may be nearly $10-20 a sign for signs over five square foot.

Other agencies in the state have also found that the cost to purchase signs prefabricated is less than the cost to purchase the various components and fabricate the signs.

38. System and the controllers used for traffic signals are no longer supported by the manufacturer.

The County utilizes one manufacturer for nearly all of their controllers with exceptions for some intersections that are integrated with the City of Daytona Beach's system. The use of one manufacturer has considerable advantages of common parts and standardization of components.

The manufacturer (Transyt) used now has ceased to exist as well as support for the controllers (1800EL). The County has been able to continue to operate with these systems through the use of existing parts and obtaining abandoned controllers from other agencies to use as a source of parts. Some County staff has developed the skill set to maintain and rehabilitate these controllers. Further, these controllers are managed by the manufacturer software, though functional is a stand-alone DOS based program. This software is also no longer supported.

The standards (NEMA) that this outdated Transyt controller utilized matched standards at its time in construction but may not match current standards such as NTCIP traffic control and ITS equipment.

Most agencies in Florida and the US are in the process of converting their older technology controllers to more modern systems. The inventory of Transyt controllers that the County uses are discards from other agencies as they upgraded their systems. The County has an individual that is skilled to maintain the current technology being used allowing this operation to continue without manufacturer support.

39. All traffic signals in the County, including eleven cities, are County maintained except for Daytona Beach and Deltona. Much of the contract work is done without formal contract.

The County provides considerable traffic signal operations and maintenance support service for other cities within the County. This includes the eleven cities and signalized intersections on FDOT roadways. The Cities' work is done on verbal agreements and billed on a time and material basis using Traffic's internal P3 database for support of the documentation and billing effort.

The reimbursement of this work is paid to the County and is placed into a County general fund account. Some County agencies within Florida that provide similar service to cities have formalized agreements to assist in this effort using a combination of fixed and time and material basis for billing. The formal agreement would allow the County budget to include these dollars as revenue in the budget process.

40. Traffic management staff has considerable skills in design and timing, which is the focus of their effort.

The Senior Engineer (Lester) in charge of traffic signal operations has extensive background in both traffic signal design and timing having worked in both the private and public sector. He is assisted by a Senior Technician (Maddox) on timing and an Engineering Assistant (Edwards) on design.

The Senior Engineer who is in the DROP program is focused on those design and timing items and is most capable to perform those functions. The day to day operations and maintenance are managed by the Traffic Signal Supervisor under the responsibility of the Senior Engineer.

41. Maintenance of traffic signals is spread throughout the County with some concentration in the northeast and southwest areas. There are more County signals in the west then there are in the east. The maintenance yard is located in the northeastern area.

The traffic signals that the County are responsible for are distributed throughout the County. The County has 414 signalized intersections with 294 of those being owned by the County. The County owns 115 in the east and 181 in the west and maintains 215 in the west and 199 in the east.

The County maintains signalized intersections for eleven cities but maintains signals within all of the city limits as County roads and State roads are within all cities. The County traffic yard is located in Holy Hill, while there is more current growth and more assets in the southwest.

42. Traffic signal staff per 10 signals is within LAC's database range.

The staff ratio to maintain and operate signals is within LAC's database average. Volusia has a staff ratio of .27 which is lower than the LAC database average and in the lower end of the LAC database range. Figure 3-15 depicts this range.

It appears in the graph that County staffing for maintenance and operations is lower than most agencies in the database. However, many of the signals used in this calculation are based on other signals that the County does on a contract basis.

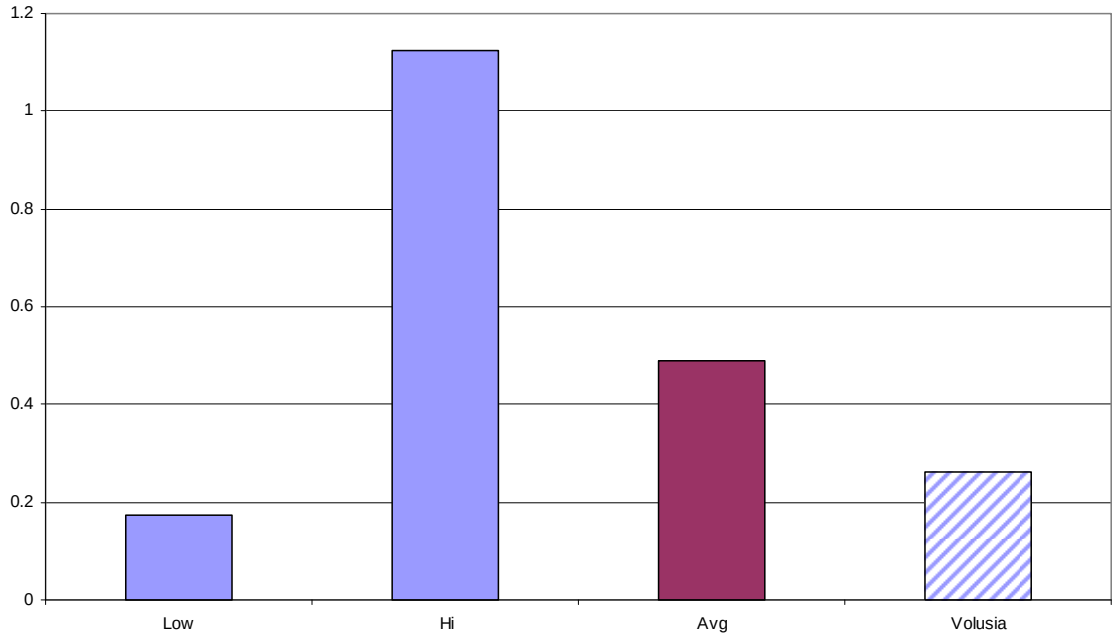

Figure 3-15 – Signal staff per 10 Signals

43. Complete inventory is lacking for traffic signs.

The County has a considerable amount of road miles and various cities and areas to maintain signs. The County does have systems for work tracking and some roadway inventory but lacks information on the location and number of signs that it maintains.

Past efforts to collect this information has been attempted, but the lack of a system and dedicated resources to keep it current, prevented the inventory from being completed and maintained. The lack of an asset inventory makes work grouping, scheduling and resource needs projections difficult to conduct.

44. Traffic Engineering has established maintenance zones that are used for inspection and work for signs and markings.

The County has established twelve geographical zones for sign maintenance. The zones are used to evaluate, group, schedule and perform maintenance. This technique along with other processes such as audio recording allows for an effective use of County resources.

The effort involves a 100% inspection by the various supervisors with all needed work identified and grouped and scheduled by areas. Then maintenance staff is scheduled to complete the grouped work by area minimizing their travel and setup time. Other staff that is not being used on these geographical areas is made available to respond to other emergency and other high priority work.

45. County uses a combination of purchase and fabrication for signs. Two independent computerized systems are utilized for sign layout and design.

The County uses a combination of resources for preparation of various signs produced. Some frequently used signs are prefabricated and attached to signs blanks and others sign faces are prepared by in-house staff.

Contract costs for other Florida agencies in LAC's database to complete a prefabricated 30" or 36" stop sign or with blank signs ranges between $24.00 - $32.00 and $35.37 - $44.46, respectively.

There are two computerized sign layout systems in place in the sign shop for the fabrication of signs. The system operates independently and has no network connection with all file transfer being done on a manual "floppy disk transfer."

46. Sign staff per lane mile is less than LAC's average.

The amount of staff to maintain all of the signs on County roads was compared to other agencies. The amount of sign staff can be estimated knowing amount of signs by asset type. The County lack of this information required an estimate to be made using lane miles.

Figure 3-16 shows the amount of signs for various agencies labeled A though R. As seen below, Volusia is lower than the average as well as lower than most agencies in the LAC database. Though not a complete statistic it does provide some information on sign asset staffing.

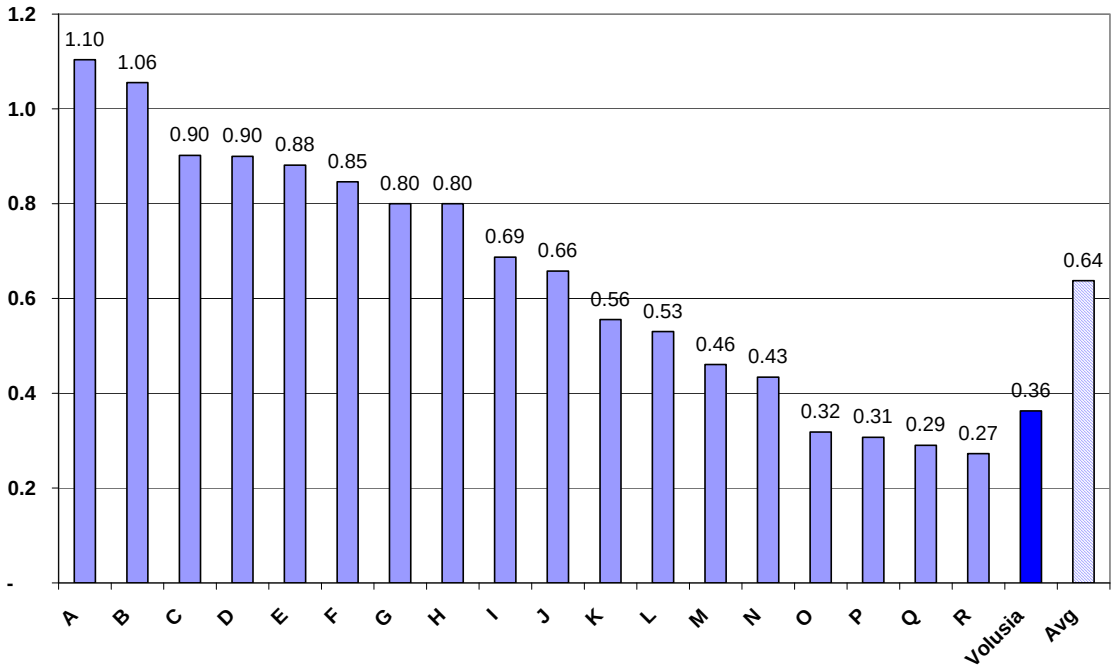

Figure 3-16 – Sign staff per 100 lane miles

47. Cost per linear feet of lane striping is reported less than the contractor's rate yet appears higher when using the appropriate overhead rate. Further, other counties have contractor rates that are lower than $.10 per foot.

The County estimated that cost to perform roadway striping is $.10 per linear foot for work being done by County crews and indicated available contract comparison was $.12 per foot. Confirmation of values just using the "in-house" PW overhead for the in-house estimate appeared to be higher with a value of $.12 per foot along with all other assumptions that the County made in their analysis.

Further, contract cost for long line striping in other areas in Florida has been observed in the State to be less than $.10 per foot estimated for the County.

48. Landfill permitted capacity for Class I cell through 2013 and Class III cell through 2018 with large expansion possibilities.

Based upon capacity reports provided by the County, phase 1 of the east cell is to be completed in January of 2007 with a permitted life of 6 years or until 2013. The Class III landfill has an expected closure date of February 2018. The Tomoka Landfill has enough space for future expansion possibilities with an expected 100 plus year life. Expansion capabilities will be necessary and appear to be available at the Tomoka site, as the County population grows and more solid waste is disposed of at the site.

49. Mix of commercial and residential is allowed at Tomoka Landfill which results in traffic conflicts and vehicle assistance.

The current route for disposing of waste at both the transfer station and Tomoka landfill is the same for commercial and residential traffic. This mix of traffic can cause vehicle conflicts and reduction of capacity for commercial traffic. Residential vehicles are generally much smaller in size. The vehicles are likely to need more assistance than commercial traffic. Commercial traffic may make many trips to the landfill and know exactly where to unload and also have much larger vehicles then the residential customers.

The mix of traffic and levels of familiarity and understanding of the landfill operations can create a potential conflict between landfill users.

50. Vehicles are disposing of materials at Tomoka Landfill after the official closing time causing need for additional overtime to apply cover.

During the weekdays of Monday through Friday the Tomoka landfill has open hours between 7:00 am and 5:30 pm. The last vehicle is allowed into the landfill at 5:30pm. This coincides with the end of an operators shift.

Landfill customers are often in the landfill unloading as late as 6:30pm. Operators must remain until the last vehicle leaves before they can begin to cover the landfill. This often creates a need for additional overtime for operators who must stay late to cover the landfill.

51. Equipment maintenance is open 5 1/2 days per week and landfill is open 7 days per week. No maintenance staff is available and/or placed "on-call" for large part of the weekend or evening repairs.

The County's fleet division has mechanics available to perform maintenance of vehicles 5 day per week Monday through Friday with ½ a day on Saturday. No maintenance staff is available on-call for weekend or evening repairs. The landfill is open 7 days per week past 5pm.

This creates a conflict when Solid Waste experiences equipment failure on the weekend or evening hours once fleet has closed. Many activities such as covering the landfill are mandated and required to be performed.

52. Specialty functions are performed by the landfill (recycling, hazardous material, woody waste).

Many specialty functions are performed at the Landfill in addition to the unloading and disposal of solid waste. There is a recycling center on-site as well as hazardous material disposal and woody waste disposal. Each of these functions has different regulatory requirements and resource needs. For example, the recycling is done through contract which the County maintains and monitors while the woody waste disposal is performed by in-house staff.

53. Landfill property is planned for multi-use with Public Works operations yard planned to be onsite.

Currently Solid Waste is the only division of Public Works that occupies space at the Tomoka Landfill. The land is zoned for multi-use with plans for all of Public Works to move there. The property is located on the eastern side of the County in Daytona and would require additional travel time for some operations, including Road and Bridges and the crews that stage out of the 44 Barn. Many of the growth areas including the southwest area would be further from the corporation yard if this move occurred.

54. The amount of roadway miles is geographically centered in the northwestern (NW) quadrant of the County which has nearly one half of the road miles (46%).

Road miles are a useful indicator in determining overall work load requirements. The northwestern quadrant of the County contains over 491 road miles, which is 46% of the 1,068 road miles maintained by the County. A greater number of road miles in an area requires additional maintenance and, in turn, additional resources.

Road miles maintained by the County that are located within each quadrant are as follows:

- Northwestern – 491 miles (46%)
- Northeastern – 255 miles (24%)
- Southwestern – 133 miles (12%)
- Southeastern – 189 miles (18%)

Staffing comparisons were performed between the four geographic areas in the Road & Bridge division. These comparisons do not include the regional crews that stage out of the northwestern area but travel throughout the County. The number of staff utilized for every 10 road miles is indicated below:

- Northwestern – 0.9 FTE/road mile
- Northeastern – 1.1 FTE/road mile
- Southwestern – .7 FTE/road mile
- Southeastern – .7 FTE/road mile

Staffing at each yard appears to be based on historical needs rather than the number of assets that are maintained or in the workload.

55. Overall staff ratio is similar to others as Volusia staff per 100 road miles is similar to the average of other agencies in LAC's database.

Staffing comparisons per 100 road miles for Road & Bridge were also performed against other Florida counties. Volusia County utilizes 8.1 FTE's per 100 road miles, which is similar to the average of 8.9 FTE's in LAC's Florida database (Figure 3-17).

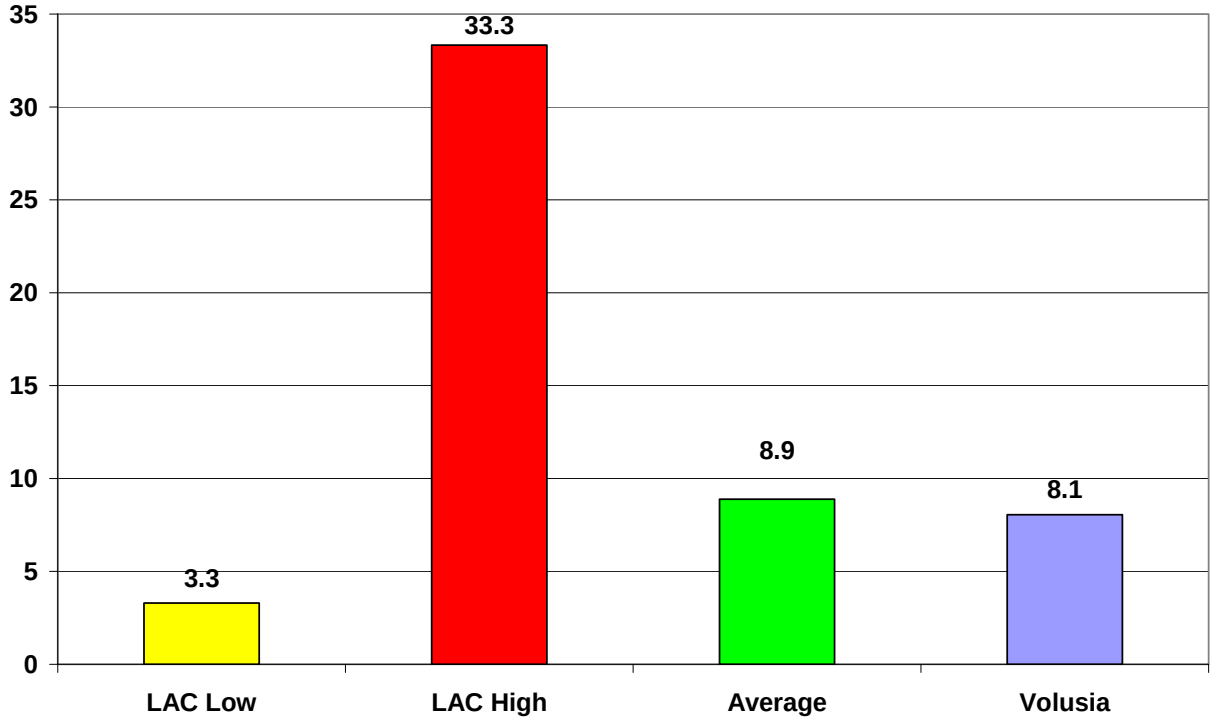

Figure 3-17 – Road and Bridge Staff per 100 Road Miles

56. The mowable acreage is centered in the northwest area with 44% of acres mowed being there.

County mowing crews are responsible for 2,809 acres. Acreage distribution among the four areas is as follows:

- Northwestern – 1,254 acres (44%)
- Northeastern – 779 acres (28%)
- Southwestern – 409 acres (15%)
- Southeastern – 367 acres (13%)

The northwestern area contains 44% of total acres maintained by the County. This is significant as the assets maintained in an area are an indicator of the total workload within that area.

57. Average sufficiency rating for bridges is above both the National and Florida average.

LAC utilized data from the U.S. Department of Transportation Federal Highway Administration to calculate average sufficiency ratings for all U.S. bridges. Comparisons were made for both bascule and non-bascule bridges. Volusia bridges were then compared against national and state averages, with ratings based on a scale from 0 to 100 with 100 being excellent condition. The sufficiency rating is broken up into three separate weighted categories and one additional category for special features which are used for determining the rating: structural adequacy and safety (55%), serviceability and functional obsolescence (30%), essentiality for public use (30%) and special reductions (13% maximum).

The average sufficiency rating for bascule bridges in Volusia County was 54.3 which are higher than both the national (49.1) and Florida averages (51.2). Non-bascule bridges in the County had an average sufficiency rating of 84.5 which is significantly higher than both the national (67.3) and Florida (65.2) averages.

Ratings are not directly related to workload but are a good indicator of prior maintenance and overall condition.

58. Dirt road program is administered by Road & Bridge with the base work performed in-house and asphalt done through contract with administration by CE and R&B.

The County utilizes contractors in conjunction with in-house work to pave dirt roads. The County is responsible for preparing the base work. Once the base work is completed the contractor will come behind the County and lay the asphalt. Work that is done by the Contractor is administered and inspected by both Road and Bridges and Construction Engineering. Road and Bridges inspect the roads that are paved with cold mix and Construction Engineering inspects roads that are paved with hot mix.

The County has currently paved 92 miles in the Dirt Road Program since 1998 with ~135 miles of dirt roads remaining. 9.5 miles of roads are scheduled to be paved in FY06/07.

59. Cost per mile has increased with a large increase in 2006.

Utilizing data provided by the County, LAC reviewed the cost per mile for the Dirt Road program between from FY 98/99 through FY 06/07. It indicates that while the total cost of in-

house work has remained the same the actual cost per mile has increased dramatically in FY06/07. From FY 04/05 to FY06/07 the cost per mile for the County has increase from ~$144K to ~$194K. This is a 36% increase in cost per road mile over a two year period or and average annual increase of 18%.

The recent cost changes appear to be correlated to the increase in petroleum costs from which resources such as asphalt are derived.

60. Pavement Management Program is managed by engineering and projects are selected by key engineering staff based on their judgment and observations. Implementation is underway on a complete condition assessment using MicroPAVER. This PMS is being established to replace the manual observation effort that is now done by one construction inspector who focuses on pavement surface evaluation and improvement.

The pavement management program for the County is managed by engineers in construction management. Projects for CIP and rehabilitation are currently selected by engineering staff based upon judgment and observations with no documented decision-making process. Further, condition assessment was performed based upon visual inspection using staff judgment.

The current way pavement rehabilitation is determined for the capitol program is through staff knowledge and key inspector condition observations. The County has one inspector whose focus is pavement and he compiles a candidate list that is circulated among engineers and maintenance supervisors for input. He then compiles the data and provides to the CIP process.

An effort is now underway to perform a complete condition assessment using MicroPAVER PMP by an outside consultant. At time of this evaluation data was not made available to LAC. Tracking in MicroPAVER is allowing the County to track and document all defects as well as the condition of the entire road network. Further, the use of MicroPAVER is allowing the County to utilize the ASTM standards for rehabilitation and planning. A consultant has been retained by the County to utilize the MicroPAVER system from APWA to perform a complete survey and assessment. The system has many analytical tools to evaluate pavement and identification of condition, needs, cost and strategy. The system is a stand-alone application that resides on an MS Access database.

Many County's in Florida use an informal system for pavement management yet three of seven Counties in LAC's Florida database are using MicroPAVER.

61. An in-house project management system is available but it is used mainly by construction with little information placed into the system by engineering, survey and ROW.

The County developed a complete project management system using the internal skills of key staff and programmed an MS Access database application. The system developed has components for each of the construction engineering functions.

The users of the system have yet to fully utilize the system and it appears to provide mainly support for the Construction Administration Group. Other groups have yet to accept and have indicated the system does not provide information that is found useful.

62. Many of the system components exist with CE staff using a combination of MS Excel and MS Access to manage the effort.

The County construction engineering uses a combination of tools, automated and manual, to manage the planning, design, rights of way and construction processes. The tools needed for capital improvement program and project management are done mainly though MS Excel and MS Word documents.

Construction management uses the MS Access program with other user's developing stand-alone tools (such as MS Excel macros) for their specific use. Some GIS support is provided for display and demonstration but it is not integrated with these documents.

63. Locates are the largest percentage of work task that Water Distribution/Collections perform with minimal work done on preventative maintenance such as valve turning, hydrant flushing or sewer line cleaning.

The Water Resource and Utilities division tracks the number of work orders issued for each type of activity. LAC analyzed County records from 2005 and found that over 62% of work orders were issued for water and sewer locates. In addition, less than 5% of work orders were issued for preventative maintenance activities such as hydrant maintenance, valve maintenance and hydrant flushing. Systematic routines based on time and /or condition were lacking for the County to apply.

64. Major activities performed by Road & Bridge staff include operation of bascule bridges, sidewalk work, install drainage, pre-mowing/trim/litter removal, emergency, retention mowing, routine tree trim, supervisor planning, litter removal, tree work-remove, ditch cleaning mechanical, sidewalk/bikepath maintenance and construction paving.

LAC performed a work load analysis based on records obtained from County staff to identify where the most time and effort are expended. LAC determined that more than 50% of labor hours recorded by Road & Bridge staff were charged to only 13 activities.

These activities include operation of bascule bridges (7.8%), sidewalk work (5.4%), install drainage (5.1%), premowing/trim/litter removal (4.7%), emergency (4.4%), retention mowing (4.3%), routine tree trim (3.4%), supervisor planning (3.1%), litter removal (3%), tree work-remove (2.9%), ditch cleaning mechanical (2.9%), sidewalk/bikepath maintenance (2.9%) and construction paving (2.8%).

65. Installation and equipment replacement are the two largest activities performed by traffic signal staff with preventative maintenance being only a small portion of the effort.

An activity analysis for signal staff was performed using County records obtained from the Primavera system. LAC determined that nearly 83% of recorded labor hours accounted for only two activities, installation (65%) and equipment replacement (18%). Preventative maintenance activities comprised less than 10% of the effort. Preventative maintenance can increase the useful life of an asset and be less expensive in the long run.

66. Four activities account for over 80% of work recorded by sign maintenance staff.

Utilizing data obtained from traffic engineering staff, LAC analyzed labor hours recorded by sign staff and determined that over 80% of time was charged to only four activities. Sign maintenance staff focused their efforts on repair, installation, removal and replace which matches the infrastructure asset that they are focused on.

67. Four activities performed by Mosquito Control staff account for over 80% of recorded labor hours for Inspection and seven of twenty-six activities recorded in the herbicide database accounted for 80% of work with one activity accounting for ~25% of total herbicide work.

Work tracking records for mosquito control activities dated from 2003 indicated that four activities accounted for over 84% of recorded labor hours. The most frequent activity was Floodwater Inspection (32%), followed by Landing Rates (21%), Trapping (20%) and Administrative (11%). LAC was unable to obtain the number of labor hours worked by Mosquito Control after 2003. This data was provided by one supervisor and was not being tracked by the other mosquito control supervisor at the time of this study.

In the herbicide MS Access database which is managed and monitored by the vegetation crew supervisor. Seven (7) of twenty six activities accounted for 80% of work for that crews. The top seven activities include: Pepper Maintenance, Aquatics, personal leave/Sick, training/class, retention area, hand clean ditch and roadside ditch. Pepper or invasive plant maintenance accounted for almost 24% of work.

68. Mosquito Control supervisors use varying systems to track portions of their work.

Work is tracked by mosquito control in three separate systems - Primavera, MS Excel and MS Access, for the differing functions of mosquito control. The heavy equipment supervisor tracks projects using the Primavera system and is the only person in Mosquito Control that currently uses and has the skill set on how to use the system. Vegetation Control uses an in-house system made in MS Access named HERB to track work and chemical usage. Reports from the HERB program are summarized and provided as the monthly chemical report to the State. The system is also used for billing. Other Mosquito Control work is tracked in an MS Excel spreadsheet that tracks chemical applications and treatments for the State. The MC group does own another system, Vector Control Management System (VCMS) but does not utilize it. Though some agencies have multiple independent databases for similar functions, it is unusual and not a good business practice.

69. Mosquito Control (MC) performs considerable amount of ditch cleaning with some related to stormwater. Some stormwater work is done by MC within City boundaries without any reimbursement.

Between March 2005 and March 2006, the County reported in one database (appears this may only be a portion of work) that they cleaned 13,125 linear feet of ditches by manual, mechanical, or spray. Most of the work occurred in October when 8,100 linear feet were cleaned or sprayed according to the monthly reports in MS Word under the source reduction category. This accounts for 61% of the total linear feet cleaned by the herbicide crew. Information tracked in the Primavera system indicates the Ditch Crew from Mosquito Control cleaned ~47,500 and mowed ~108,000 LF June 05 – May 06.

Some of the ditch cleaning by MC is reimbursable from the Stormwater Utility for facilities within the unincorporated County. All maintenance of the ditches, either mechanical, hand, or spray, that was performed to sustain flow and keep other County infrastructure or the public safe was billed to Stormwater for the unincorporated areas. Some work that is stormwater effort within various City boundaries and the MC district is done by MC.

70. Solid Waste performs many different activities without the ability to discern work activity effort. The focus is on specific projects and daily completion of effort.

LAC observed the Solid Waste division performing many activities. In addition, based on research of County effort, additional activities were identified. These activities include: Motorgrading, Dozing, Backhoe operations, Hauling Cover, Loading, Sorting (Household, Recyclable & Hazardous), Compacting, Spotting & Directing, Mowing, Turf Cultivation, Irrigation, Landscape Maintenance, Roadway Maintenance, Well Monitoring, Sludge Pit, Enforcement, Waste Educations, Drainage Maintenance, Water Truck Operation and Sorting Hazards out of loads.

While many activities have been identified, Solid Waste currently lacks an activity based tracking system to track and plan actual work performed. These activities are monitored without systems for assurance of effective and efficient processes.

71. Current methodology for cover at the Landfill results in 33% of airspace being utilized by fill.

The County uses a combination of materials for cover from soils to mulch to other alternative cover. The amount of cover used last year was 173,625 cubic yards (CY) of dirt and 93,043 CY of alternative cover. This amounts to about 33% of all of the airspace utilized. Best management practices to meet cover requirements but minimize the cover application to maximize landfill space with best expectation is about 15-20% of airspace being ideal. The lower the percentage the more solid waste can be handled in a more effective manner.

Though the County values are higher than ideal, mulch from vegetation delivered to the landfill is used as cover, negating some of difference between County and an ideal situation. The amount

of mulch has been readily available for cover as a result of the major hurricanes the County experienced during the last two years.

72. Cover application at Landfill is done by manual estimation from spotters and equipment operators.

The County application of cover is made by judgment of the operators in applying the material with assistance of the part time spotters for placement of the cover. The main focus is to properly cover the waste to minimize odor, leakage and material wind issues.

This technique is most difficult for applying an even application that meets requirements of material cover while providing proper cover and control for odor and/or waste blowing issues.

73. Most County operations have work methods that are based on employee and supervisors judgment without best methods established and/or documented.

Defined work methods are verbally communicated for most activities that the County performs as a whole. The definition of specific activities varies among crews based on LAC's observation and discussions with staff. Further, documentation of a specific activity definition was lacking with the exception of Traffic Signs and Solid Waste. Solid Waste and Traffic Signs have processes outlined for major activities such as MOT, sign replacement and installation and closures.

The specific labor, equipment, work methods, quality standards and anticipated performance are determined by each crew with some direction from supervisors. The documentation and standardization of the work methods and resource allocations are lacking.

74. Twenty-two different overhead rates are used by Public Works with 3-4 additional overhead rates in MC. County is unique in that it uses multiple overhead rates by division yet there is a lack of understanding by the various divisions of their application. Florida counties in LAC's database use between 1-10 overhead rates with most using 2-4.

Each division utilizes multiple overhead rates depending on the type of customer being billed and the division doing the billing. Each division has 3 individual overhead rates by customer type, with Mosquito Control having 6; 3 for mosquito control and 3 for mosquito control-ditch. Customers are divided into three separate categories including inside public works. Work performed for another division in public works is charged these rates. The second customer type is inside the County. This is the overhead rate that is charged to other departments outside of Public Works but still within the County. The outside County rate is billed to all customers including contract cities for work performed by Public Works. The table below shows each of the rates as calculated by County staff (Table 3-7). The column furthest to the right is for billing outside the County. The center column is for billing inside the County, but outside of Public Works and the left-most column is for billing within Public Works.

The Department lacks a clear understanding of how and when these rates should be used. In addition to avoid confusion with its customers, Mosquito Control utilizes 3-4 additional rates,

which may be a blended version of the fiscal rates for work done. MC has independently compiled these rates for various customers that are utilized in contracts and does not utilize the rates outlined below.

The rate Mosquito Control is billing is a blend of the inside rates and not the external County rate which reduces the billing to a lower value than the actual allocated cost by Fiscal. Further, mosquito control does not properly apply the overhead rate to the hourly rate, but simply multiplies the overhead rate by the hourly rate which further reduces the rate for billing. This has resulted in the County billing lower than costs allocated to perform the work.

Table 3-7 – Overhead Rates by Customer Type and Division

Volusia Overhead	Inside PW	Inside County	Outside County
Mosquito Control	163%	179%	256%
Mosquito Control - Ditch	81%	95%	163%
Road & Bridge	127%	130%	154%
Solid Waste	135%	137%	159%
Traffic Eng.	125%	132%	155%
Construction Eng.	219%	224%	242%
Utilities			132%

The number of overhead rates used in Volusia is greater than any of the other counties in LAC's database. Most agencies utilize 2-4 overhead rates with some using up to 10. These other agencies often established a practice to calculate more overall overhead rates. There were issues also in most the new CMMS systems in the lack of ability to accommodate the amount of rates Volusia has in their automated systems. Further, it is difficult to monitor billing for more than 4 overhead rates. Instead most of these agencies in LAC database calculated overhead rates, in general, by department and not by individual division.

75. Volusia FEMA overhead rates are within the range of LAC's experience for both regular and overtime.

The County has recently defined an overhead for standard and overtime work related to FEMA disasters. Regular time overhead is established at 47.3% which is within the LAC database range typically between 27 – 68%. The established overtime overhead rate of 17.7% is also within the range of the LAC database of 0 – 28%. Additionally, work tracked in the Road and Bridge TIS system is flagged with a FEMA designation for ease of reporting once a disaster has occurred.

Rates can easily be extracted and the FEMA overhead applied for Project Worksheet reporting. FEMA approves an agency's rates following a specific format. Often the amount of the reimbursable as result of overhead can exceed that for equipment and or materials. The rates do vary by agency and are a result of a specific agency's ability to justify the rates with supporting documentation.

76. Mosquito Control and Construction Engineering have the highest labor overhead among the various divisions, which exceeds the average of LAC's database.

LAC reviewed the average overhead rate calculated by fiscal and used by each division for billing within the County. Mosquito Control and Construction Engineering had the highest

averages with 222% and 171%, respectively, which is higher than the LAC database average of 123%. This average for the County was obtained by calculating the average of the 'Inside Public Works' and the 'Outside Public Works, Inside County' rates were obtained from County staff.

77. Average avoidable overhead (rate for "inside Public Works") used is similar to LAC's database.

Overhead rates for each division were obtained from County staff and used to calculate an average overhead rate for the entire agency. LAC used an average of all rates for billing inside the County. Rates used for billing outside the County were excluded from this calculation since they are full overhead rates as opposed to avoidable overhead rates. Volusia's average rate of 146% is within the range of agencies in LAC's database which use overhead rates ranging from 97% to 173% with an average of 123% (Figure 3-18).

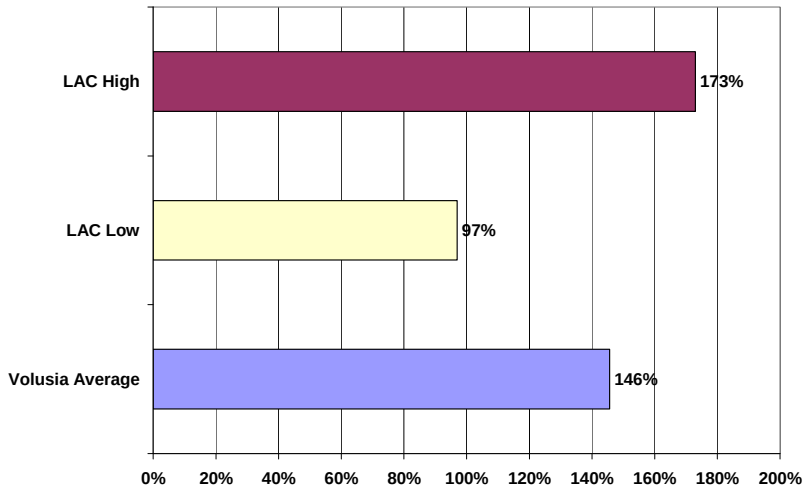

Figure 3-18 – Avoidable Overhead Comparison

78. Traffic and Utilities material overhead rate is above average compared to the rest of Public Works and LAC's expected range of 10-20%.

Material markups have been established for each division with the exception of Construction Engineering by fiscal staff in the administration group (Figure 3-19). The Utility division uses a rate of 33.37% and Traffic uses a rate of 14.33%. These rates appear high based on LAC's experience of 10-15% for similar agencies.

A high material overhead indicates the County is expending additional resources in these divisions on managing and handling materials. Material overhead includes the resources such as labor to manage the materials as well as the cost of the facilities where the materials are stored. In some instances, a portion of time or a site may be allocated to the material overhead if warranted.

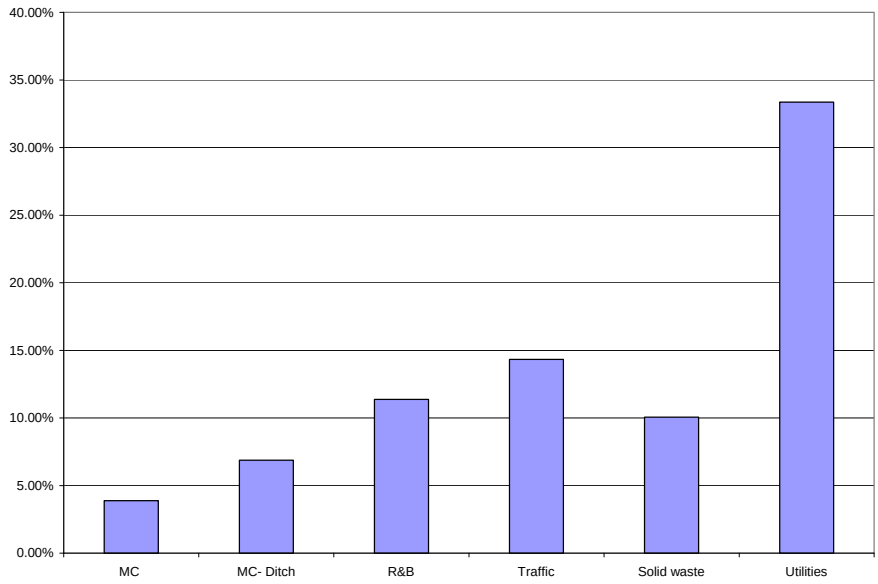

Figure 3-19 – Material Overhead Comparison by Division

79. Performance measures are in the budget yet linkage does not exist with explicit budget amounts.

The County has established performance measures for each of the divisions of Public Works within the budget. The performance measures identify a goal by percentage or work unit that the division plans to accomplish. However, while goals have been established there is no direct linkage between the performance measures and the actual budget amount. For example, Traffic indicates that it has plans to stripe 130 miles in the next fiscal year. While the goal is established there is no indication of resources needed or cost to stripe 130 miles, but only the overall traffic budget which includes the cost to perform all traffic work.

A list of key objectives and performance measure for the 05/06 fiscal year has been provided below.

- CE Key Objectives
  - Percentage of Projects on Schedule – 85%
  - Percentage of Goals Achieved – 85%
- Road & Bridges Performance Measures
  - Number of days to grade dirt roads – 10 days
  - LF of stormwater pipe installed– 3,055
  - Cost per acre to mow - $70
- Traffic Performance Measures
  - Number of Signals Maintained - 392
  - Number of Signs Installed of R&R – 10,000
  - Number of Miles Striped – 130
- Solid Waste Performance Measures
  - Number of residential served – 41,973

    - Percent of satisfactory complaints resolved – 99%
    - Percent of residential waste collected for recycling – 39%
- Utilities Performance Measures
    - Feet of drainage pipe replaced – 8,500
    - Number of meetings with the public per year – 6
    - Acres of Land Acquisition – >10
    - Number of interlocal agreements- 5
- Mosquito Control
    - Feet of drainage pipe replaced – 8,500
    - Number of meetings with the public per year – 6
    - Acres of Land Acquisition – >10
    - Number of interlocal agreements- 5

80. A CIP compilation process exists using a combination of manual and MS Excel systems. A single source work plan is compiled that displays in both a spreadsheet bar chart and GIS maps.

The County construction engineering does compile a CIP using an MS Excel spreadsheet and monitors the overall status of these approved projects throughout the year. Administrative staff, with the director's guidance, compiles the initial plan and takes it through the approval process.

Once approved, the projects are monitored throughout the year at various stages. Each group with CE monitors their project and status in a more detailed manner and administration monitors the overall projects using spreadsheets. The projects are manually entered into the GIS system to display general location and type of projects.

81. The County performs a complete process for managing projects from inception through planning and design to construction. A project management system does not currently exist with functions managed separately by assigned staff and monitored by CE administration.

The County Construction Engineering handles the entire process of a project from conception to planning to right of way to design using a combination of in-house and external sources. The process involves communication with many entities and agencies.

The process matches most functions that exist in a project management system. These functions are already managed though many methods and business processes. The entire process is mainly a manual effort that is managed and monitored.

82. Project Managers (PM) manage production using in-house and out-sourced resources with considerable (9) staff available for production.

The County uses a group of project managers to manage each project from design until it reaches construction. They coordinate with all parties from permit processors, reviewers, designers, survey, ROW and others to complete this effort. Projects are designed by external resources and in-house staff. Most large projects are outsourced, but the in-house staff has both manual layout and design as well as CADD skills.

The internal size of the staff is considerable and is now mainly used for support and reviews, but not plan production. The nine person team should have the capability with industry 15% of construction cost anticipated to produce plans exceeding $5 million annually in construction projects yet they have been relegated to minor projects and plan checking functions.

83. Survey has mapping capabilities and utilizes both external and internal capabilities with two in-house crews. The survey coordination requires considerable effort.

The County has a combination of skills for survey teams and uses them to perform work, support contract work and minor short term efforts. The preparation of survey effort requires considerable coordination and gathering of information.

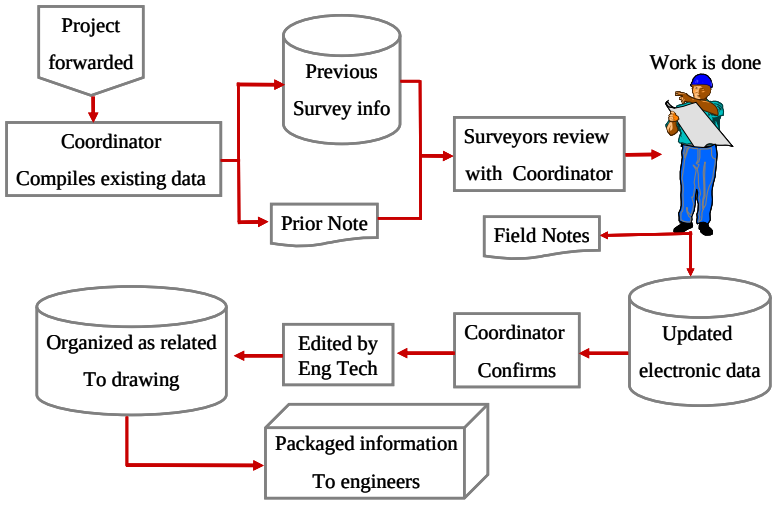

Figure 3-20 – Survey Process

Figure 3-20 outlines the process. A coordinator that supports survey, once given a project, must compile information for the survey team to fully understand the work scope, review existing benchmarks and have historical survey data to work. Work requires data being transmitted both manually and electronically in addition to much coordination.

84. The right of way function uses a combination of manual forms and spreadsheets to monitor work effort.

The ROW function is a key support component of the construction engineering group that must keep considerable records on various transactions such as deeds, easements and other legal instruments.

In addition, this group must monitor and track various instruments' status though the processes to insure that the necessary property rights are obtained in an orderly manner.

85. A systematic approach has been established using a MS Access program and data formatted within spreadsheets is used to monitor construction effort by contractors.

The construction group uses the internally developed system to manage the inspector's process as well as administer the construction contracts and estimate pay amounts for projects. Further, spreadsheets are developed to allow inspectors to track status and produce reports and pay amounts.

The process is complete yet does require some manual coordination and data manipulation from the supervisor for the process to completely work.

86. Stormwater owns vehicles that are operated and utilized by others yet receive charges on an hourly basis. The stormwater vehicle replacement program has yet to be determined.

Stormwater is a separately budgeted function that is managed under the Water Resources and Utilities Division. Stormwater has several positions and pieces of equipment that are allocated to it. While Stormwater is monitored through Water Resources and Utilities, many of their functions are performed by the Road and Bridge and Mosquito Control Division. These divisions will charge their time back to Stormwater in the form of invoices. These invoices will charge for labor, equipment and materials used by the appropriate division. In many cases the equipment used for Stormwater work by these divisions is the equipment that is actually owned by Stormwater.

Stormwater is being billed by Road and Bridge for the hourly equipment use of equipment it purchased for use by others to perform Stormwater work. It appears that Stormwater is being billed twice for equipment it owns. The first time was during the original purchase of the equipment and now hourly through charges made by other divisions. This process is adequate and appropriate if Public Works replaces the vehicles in question when the vehicle life is exceeded. If Stormwater replaces the vehicles in the future the hourly charges would be double counted for the same charge.

87. Stormwater's operational arm is a combination of Road and Bridge and Mosquito Control divisions which utilize a majority of the budget. Work is done by three different groups including R&B, MC and contractors.

Stormwater is managed by the stormwater engineer and an inspector engineer within the Water Resources and Utilities division. The engineer and inspector act as project managers with other divisions performing the work. Road and Bridge and Mosquito Control perform most of the work and utilize the majority of Stormwater's budget.

In FY 05-06 $2.2 million of the $4.75 million budget for Stormwater was reimbursed to the Road and Bridge division for work performed for maintenance of existing assets and capital improvements according to information provided by the fiscal. Mosquito Control was reimbursed over $0.7 million in FY 05-06 for maintenance of Stormwater assets according to information provided by fiscal. Outside contractor work is also obtained mostly for capital and special projects.

88. Stormwater assets responsibilities are shared with Road and Bridge, yet it appears to be their responsibility according to the ordinance that created the utility.

According to County ordinance No.92-89 storm assets are "…components which provide for collection and disposal of stormwater…" The Road and Bridge Division performs some non-reimbursable work on components which provide for collection and disposal of stormwater within County rights of way leading to some confusion as to whether work performed is reimbursable or not. Additionally, the County policy currently utilized states that 100% of all permitted retention ponds, 50% of cross drains and 100% of all outfalls are Stormwater responsibilities. Other retention ponds and many piping systems used to collect and dispose of stormwater are Road and Bridge responsibilities. Further, inmate work on retention ponds by Road and Bridge was observed to not be reimbursable, adding to the confusion.

Organizing

89. Work hours vary by group with some groups planning overtime on a weekly basis.

Most employees in Public Works work split 4/10's with coverage Monday through Friday, but the working hours vary between each division and within some divisions. Inmate crews work split 4/10's with coverage for Monday through Friday. Bridge Tenders work 8 hour shifts with coverage 24 hours a day, 7 days a week. Mosquito Control works 5/8's. Utilities have coverage 7 days a week between 7 a.m. and 11:30 p.m. with staff working 5/8's, 4/10's and one employee working 10 days on and 4 days off. Solid Waste has mostly 4/10's with some 3/11 and a 1/7.

Solid Waste currently plans overtime on a weekly basis for some of its employees. Those who add the cover to the landfill each evening plan for overtime each day due to the amount of work that must be performed after the landfill closes. Road and Bridge also expends a significant amount of overtime as a result of working for contract Cities.

90. Average length of service is 11.4 years with the County, and this is within the average range of 10-15 years in LAC's benchmark database.

The average length of service for County staff within the Public Works division is 11.4 years, which is similar to LAC's database range of 10-15 years for similar agencies. While the average is 11.4, there are many classifications with an average greater than 11.4 and many with an average than 11.4. In general the supervisory and management positions have years of service greater than 11.4 years. In addition many of the professional staff have a long history of service with the County. These employees have a wealth of knowledge and understanding of the County. In addition, this indicates the potential for many employees to be in the DROP program as employees start to near retirement.

91. Overtime is 9.2% of regular time which exceeds average of LAC's database of 4.9%. Solid Waste and Road & Bridge have overtime percentages of over 13%.

Hours tracked by the County in its financial system included 63,698 hours of OT, 690,965 of regular time and 118,654 of Holiday/Leave Time in 2005-06. Overtime is 9.2% of regular time charged during this period. This is equivalent to 31-36 full-time employees based upon an

average full time employee having 1,760 available working hours. The average of other agencies in LAC's database for overtime was 4.9% with a range from 1.3% to 11.6%.

Road and Bridges and Solid Waste utilized the most overtime as a percentage of regular time among other divisions within Public Works. Overtime utilized by Solid Waste in 2005-06 totaled 17,856 hours, or 14.4%, of regular time charged by Solid Waste employees. This is the equivalent of 8-9 full-time employees. Road & Bridge charged 32,688 hours, or 13.1%, of regular time charged by Road & Bridge employees. This is the equivalent of 18-19 full-time employees. Overtime in Road and Bridges may be a direct result of work for contract cities. The overtime in Solid Waste appears to be caused by operators staying late as a result of the need to cover the landfill once the last vehicle unloading waste has left the landfill.

LAC did compare overtime of Volusia County Solid Waste to four other Solid Waste Facilities. Based upon this comparison overtime was similar to that of the other agencies. The average overtime for the four comparable facilities was approximately 14%.

92. Heavy equipment operators in Road & Bridge are cross-trained and perform both operator and maintenance work as there are a minimum number of maintenance workers on staff.

Road and Bridge equipment operators are cross-trained to perform all types of work. Those operators with lower classifications are allowed to practice on higher level equipment under supervision of qualified operators in low or zero traffic areas. Each job site utilizes County equipment operators and does not use maintenance workers.

When laborers are needed, day laborers are brought in for such activities as tree chipping, flagging and other manual work. Many of the day laborers are used on the same crew for periods of time where others are only retained for a day. LAC observed at the end of the FY 05-06 that Road and Bridge temporarily discontinued the use of day laborers due to budgetary constraints.

The use of operators allows flexibility yet does increase operational costs which are from LAC's seven County database.

93. Administration Section provides support, conducts analysis work and assists in system development. Staff has multiple skills in GIS, budgeting and analysis.

The administrative staff, under the Operations Manager, performs many tasks for each of the divisions within Public Works. The Fiscal Resource Manager creates the overhead rates each year for all of the divisions and works on budgetary items as well. The Special Project Manager is in charge of any special projects within Public Works and the analysis of changes due to management decisions. The GIS Specialist II supports the Special Project Manager and is in charge of making customized GIS maps for each of the divisions within Public Works as well as the integration of programs such as the Traffic Crash system with GIS.

Many of their analysis tasks are hindered from a lack of a unified and automated system.

94. Construction Engineering, Solid Waste and Water Resources and Utilities spans of control are within range with some exceptions based on function which appear reasonable.

Span of control is an indicator of how many employees report directly to one supervisor. LAC reviewed the span of control for Construction Engineering, Solid Waste and Water Resources and Utilities. All appear to be within the best practices range for operations, which is between 4-10 employees.

In Construction Engineering the range for supervisors to direct reports was 1:2 to 1:9. There were several engineers that did not have direct reports, or had a limited number of direct reports. While this is out of the range described above, this appeared to be reasonable based upon the functions performed.

The span of control for Solid Waste ranged from 1:2 to 1:14. While there were several positions that had no employees that reported directly to them or had less then 4 employees reporting to them, such as the recycling coordinator, they appeared to be reasonable based upon the function and type of work the employees performed.

Water Resources and Utilities span of control ranges from 1:1 to 1:10. The 1:1 was for the stormwater function and appeared to be reasonable based upon function and assets.

95. County R&B staff was reportedly reduced after Deltona and DeBary were annexed yet work is still being done for both via contract with increases in overtime.

County staff reported that after the cities of Deltona and DeBary were incorporated in 1993 and 1995 respectively, the County's workforce was reduced due to the loss of the unincorporated area. The County has since entered into contracts for the maintenance of both Deltona and DeBary roads and certain rights of way without increasing the number of employees to service the area. This has lead to a high level of overtime throughout County functions. Road and Bridge overtime in FY 05-06 accounted for 13.1% of the regular time reported and accounts for 18.5 FTEs.

96. R&B crews are organized both geographically and functionally.

Road and Bridge crews are divided either geographically or functionally. Functionally divided crews generally report to one yard and will perform work throughout the County. These include the Tree Remove crew, the Welders, the Shoulder crews and the Vac/Video/Canal Maintenance Crew.

Geographic crews are those which generally report to a given yard and perform work within the given area around the yard. Geographic crews in Road and Bridge include the Tree Trimming crews, construction crews, inmate crews, maintenance crews for each yard and the Bridge Tenders. One geographic crew of note is the Westside Construction crew that is devoted solely to the City of DeBary.

97. Traffic Engineering administration provides direct operations support yet reports directly to the Traffic Engineer.

Traffic engineering administrative staff performs many administrative tasks for operations. The major tasks include receiving citizen complaints and report generation using the current Primavera system and converting the report data into an MS Excel format. The administrative staff, however, does not report to the operational level. Instead, the Traffic Engineering administrative staff reports directly to the Traffic Engineer.

In addition to administrative functions, this group provides some direction to signs and markings staff and monitors as well as provides record keeping of both signs and signals.

98. Water/Wastewater Treatment is combined on the east side yet is separated on the west side of the County.

Utilities manage their sewer and water treatment assets differently in various geographical areas within the County. They do allow staff to work in both sewer and water areas and many are cross-trained as well as cross-certified.

On the west side of the County there are two groups of staff manning independent water treatment and production and sewer treatment assets. On the east side the assets are handled differently with both water and sewer performed by same group of staff. The sizes of the assets are a smaller scale in the east and are more conducive to a "sharing of functions" concept.

Most agencies in the LAC database perform water and sewer with different staff unless they are a very small agency the Volusia County practices appear to allow for more optimization of staff utilization.

99. Span of control for Mosquito Control exceeds range for good business practices and LAC's database.

The span of control for mosquito control ranges from 1:3 to 1:15. The director currently has 15 direct reports according to the organization chart. This is above the average best practice of 4 to 9 direct reports per supervisor. With an exceeding number of direct reports it becomes difficult to manage effectively.

The 1:15 at the director level exceeds good business practices for this management level unless staff works independently and needs little or no direction. This information was originally collected in July through September of 2006 and is representative of that point in time. The County has reduced the span of the control of the Mosquito Control director to 1:3 as of the completion of this report.

100. Administrative Staff by division is high for Solid Waste, Traffic Engineering and Water Resources and Utilities.

LAC reviewed the administrative staff as a percentage of overall employees for each division. Administrative staff was staff that assisted in data entry, compilation of billing and general office

work. Employees that are not included in this analysis are planners and engineering staff. The administrative staff used in the analysis are as follows.

- Construction Engineering- one administrative coordinator I, two office assistant III's and one staff assistant I.
- Mosquito Control – one administrative coordinator II, one staff assistant I and one staff assistant II.
- Road and Bridge – one Holly Hill office assistant, one engineering assistant, one part time position and one NSB office assistant II.
- Solid Waste – one administrative intern, two administrative coordinators, two office assistant III, one office assistant IV, two staff assistant II and one staff assistant I.
- Traffic Engineering – one administrative coordinator I, three administrative assistant III and one staff assistant.
- Water Resources and Utilities – one administrative coordinator I, one office assistant I, two office assistant III, one staff assistant and two staff assistant II's.

Figure 3-21 outlines the percentage of administrative staff by division. Solid Waste and Traffic Engineering have the greatest percentage of administrative staff with 12-13% of their employees being administrative related.

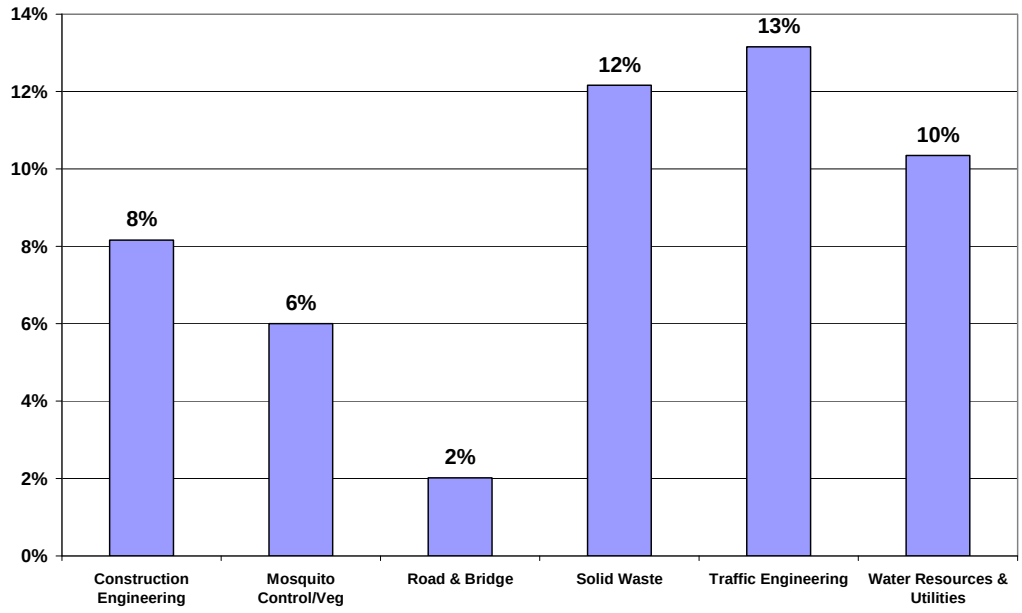

Figure 3-21 – Percentage of Administrative Staff by Division

101. Considerable number of staff are in the DROP program. Succession planning and training has been discussed yet no programs exist.

There are currently 27 employees enrolled in the DROP program, many having key positions with large amounts of accumulated leave and benefits that impact operations. Eleven of the employees in the DROP program are in Road and Bridge, six in Mosquito Control, three in Solid Waste, three in Construction Engineering, two in Traffic and two in Utilities. County staff has

expressed concerns about those employees in key positions and the affect they are having on their subordinates.

Succession planning for those key positions is currently lacking. Plans for succession have been discussed, but no program has been created for the training of the new staff to take over the positions.

102. Road and Bridge and Solid Waste combined comprise of over 50% of employees in Public Works.

Road and Bridge and Solid Waste combined have the majority of employees within Public Works. Road and Bridge has 154 employees which is 36% of all Public Works employees. Solid Waste has 74 employees which is 17% of all Public Works employees. Combined, the two divisions comprise 53% of all the people in all of Public Works.

103. Inmates perform concrete and other specialized work. Inmate crews are managed by one certified supervisor with crew sizes of 4-9 and a cost of $12.03 per hour which is lower than LAC's Florida County range of $13 to $36 per hour.

Inmate crews are currently used to perform labor intensive activities throughout the County. Much of the work is litter removal, vegetation control, mowing and cemetery maintenance. The County also uses inmate crews for some specialized work such as concrete. This includes the prepping, pouring and finishing of sidewalks and driveways. LAC has not observed this approach in any other agency.

Inmates are taught how to pour the concrete and then finish it. Due to security concerns, individual inmates are seldom reused, so inmates must be trained for every new group of inmates that are used.

The County utilizes inmates to supplement their staff. Crews of 4-9 inmates are directed by a certified inmate supervisor. The crews are used for a variety of staff from cleanup, vegetation removal, ditch clearing and other manual tasks.

Considering all cost of labor, equipment and supervision the net cost per hour per inmate is $12.03 which is lower than the LAC database average in Florida.

104. Traffic studies such as counts, classification, speed, signal warrants, etc. are performed both in-house and by contractor.

The County performs many traffic studies to determine installation of various traffic components such as stop signs, signals, flashers as well as traffic counts and trip generation and turning movement counts.

The County performs most of these through standing contracts with engineering firms and manages the process with traffic technicians. However, some of the work is done with in-house staff as the effort may require a different focus or explicit timeframe. This is consistent with other Florida Counties that perform such tasks with both in-house and external resources.

105. Traffic planners perform work independently of the other units within Public Works with only limited communication with CE and Traffic Engineering.

The County has two staff members in the traffic group that work in various long range efforts for Metropolitan Transportation Organization (MPO), strategic plans and circulation elements, multimodal efforts and environment impact documents. Their effort requires some communication with other staff in Public Works and traffic, but it is minimal as they operate independently.

This function is often in planning but sometimes is in engineering, development, or traffic engineering in other agencies.

106. Utility engineers and storm water manager perform similar functions as the CE project managers but utilize different tools and systems.

The County has two groups of engineering staff that manage the project development, coordinate survey and right of way determination, complete preliminary engineering, produce final plans, specifications and estimates and obtain necessary permits for regulatory agencies. One is the project manager (PM) in the construction engineering for roadway, drainage and traffic improvements and the others are the engineers in Utilities for water, sewer and stormwater. In fact the similarity of work is alike as just recently one staff moved from PM to Utilities and is performing the same function in a very short time frame.

The Stormwater Manager also manages contracts for design, planning and construction. He has independently established methods to monitor this effort.

The tools that each group uses are different with both using internally developed products that each group has compiled. In addition, CE uses some GIS capability where as Utilities does not. This design function that is being done by both groups is combined in some other agencies.

107. Some divisions monitor "out of the yard" hours for equipment in their system while others lack tracking of equipment use.

Each division within Public Works is tracking work differently in their respective systems. Both Road and Bridge and Traffic Engineering currently track information for their equipment as out of yard hours. Out of yard hours account for all time that any piece of equipment is not in the yard, including travel time to jobsites and any time onsite, but not in use. This is used to account for the opportunities lost by using the piece of equipment on one job instead of any other. Road and Bridge also tracks in-use hours as well as the out of yard hours in the TIS system in addition to down time for equipment.

Some of the divisions currently do not track equipment out of yard hours time in their system. Some of the divisions store in use hours, such as Solid Waste which tracks equipment usage in a separate system for tracking when PMs should be performed.

The out of yard hours are used for many reasons but mainly as a component needed for equipment justification and unit cost evaluation with rental equipment.

108. Most fleet charges are based upon historical charges from previous years and not on current actual expenditures. Only materials are charged in the appropriate year that they occur.

The Fleet Department charges the divisions for its services. These charges are based upon the prior year's expenses for both labor charges and actual current year expenditures for material charges.

For instance if a division eliminates several pieces of equipment within the year and does not replace the equipment the division will still be charged for the labor expenses based upon prior year expenditures. Likewise, if a division purchases several new pieces of equipment that the Fleet Department is unaware of, the Fleet Department will not charge for the equipment based upon prior year expenditures where the pieces of equipment were not included. Thus they may actually charge less than needed to maintain equipment. There is little incentive on a financial basis for optimizing fleet within the fiscal year and actual cost are not accounted for in the year of operations. This is contrary to most established rates of good business practices from either APWA or NAFA

While the Fleet division does try to make an effort to determine what the future vehicle purchase will be by the division to recoup their costs, new vehicles appear to be based upon budget estimates as some vehicles will be purchased throughout the year.

109. Fleet PM's follow accepted business practices.

The Fleet Department has established interval for equipment PMs. The intervals are determined based upon heavy/diesel equipment or light equipment. Heavy diesel equipment has two service intervals. A PM "A" is performed every 200 hours and a PM "B" is performed every 1,000 hours.

Light equipment has three intervals based upon mileage: 5,000, 15,000 and 30,000. Based upon APWA and NAFA standards these PMs follow accepted business practice of maintaining equipment while minimizing unnecessary down time due to routine maintenance.

110. Equipment rates and usage within the various systems are inconsistently compiled and updated. Rates are estimated not computed from actual charges although information is available in the Fleet Management System.

The Public Works Department utilizes many systems for tracking equipment usage within each division. Each system has a designated rate which is used for billing and cost analysis, but the equipment rates vary by division.

Road and Bridge utilizes TIS for working tracking. In the past the rates were calculated and updated in the system, but this has not occurred in the past three years. Mosquito Control utilizes

industry rates in their billing, Traffic has estimated rates and Utilities does not track equipment usage or have a rate established at all.

While rates exist they are not based upon actual charges or cost of maintaining a piece of equipment. The true cost of a piece of equipment can be calculated by adding the maintenance cost, fuel cost and annual depreciation and dividing by the total out of yard hours. This will provide an hourly rate for a piece of equipment and allow for accurate cost accounting for billing and analysis of unit cost to perform based upon actual equipment expenses.

The County has the information available to calculate Fleet Rates with information contained in the Fleet Management System. The Faster Fleet Management system utilized by the County contains the fuel cost, maintenance cost and life of the vehicle. This information combined with the actual out of yard hours tracked in some of the various County systems can be used to calculate equipment rates based upon the actual cost of the County to own and use equipment versus industry standard rates that may vary from the County's rates.

111. Life Cycle can impact fleet costs and be used to determine optimal replacement time of equipment

The Fleet Department has the ability to perform life cycle costing and has begun to work with Road and Bridge and Solid Waste to perform life cycle costing on their assets. Life cycling costing can be used to determine the optimal replacement time of equipment based upon the annual cost to maintain and service equipment.

As the annual cost to maintain an old piece of equipment exceeds the annual cost to purchase a new piece of equipment, it may be more cost effective to replace the piece of equipment. In addition this analysis can minimize the amount of downtime as a result of pieces of equipment breaking down causing crews to wait for a replacement piece of equipment or rescheduling projects.

112. Road and Bridge utilizes approximately 50% of all rolling stock.

County records indicate 247 of 499 vehicles classified as rolling stock are assigned to Road and Bridge. This is approximately 50% of all rolling stock owned or leased by Public Works. The more equipment owned and operated by a division the greater effort it takes to manage, schedule and monitor the equipment. A detailed list of equipment is provided in Appendix A-1 and A-2.

113. Average fleet age is low compared to other fleet data in LAC's database.

The average age of all rolling stock is approximately 6.2 years. This is less than other agencies in LAC's database. A young fleet generally indicates that there is a lower cost and less maintenance that needs to be performed on the fleet. Many pieces of equipment that are less than 6 years old are in the Fleet rental/lease program. The Fleet Department owns these pieces of equipment and replaces the equipment based upon a 15-point system as the equipment begins to exceed the cost of purchasing a new piece of equipment.

114. Vehicle records indicate low use for many vehicles according to APWA standards.

Vehicle records provided by the County Fleet Department were used to determine average annual mileage and hourly usage for each vehicle class. Averages were then compared to American Public Works Association (APWA) standards to determine low use equipment. Results varied among the separate divisions and LAC identified 28 tractors, 16 pickups, 13 mowers and 52 other pieces that were at least 2 years old and had an average annual meter that is less than half of the APWA standard. Equipment that was under two years old was not used as these pieces of equipment had limited usage history and may have been acquired mid-year or later skewing the average annual usage. The County also utilizes trailers and other non-rolling stock that was not used in this analysis, as accurate hour and usage information was unavailable. A detailed list of low use equipment is included in Appendix-B.

115. Trailers, pumps and generators account for most of the non-rolling stock.

The County owns 219 pieces of equipment classified by LAC as non-rolling stock. This includes 60 trailers, 41 generators and 33 pumps which, when combined, comprise 56% of all non-rolling stock. Most non-rolling stock is utilized by Road & Bridge and Solid Waste. Non–rolling stock comprises a large component of the overall fleet and requires similar effort to manage, schedule and monitor as rolling stock. The County is not currently tracking the non-rolling usage for trailers, generators and pumps.

116. Lease/rental equipment, which is mainly sedans and pickups, make up 29% of the fleet with replacement needs determined by the Fleet Department.

The County utilizes leased/rental vehicles for performing maintenance activities. Leased vehicles make up 29% of all equipment and include 2 sedans, 104 pickups, 18 SUV's, 9 trucks, 2 minivans, 5 vans, 1 excavator, 3 dump trucks and 1 backhoe loader.

Vehicles are leased from the Fleet Department by the individual Public Works divisions. The Fleet Department owns the actual pieces of equipment and is responsible for purchasing the replacement vehicles in the rental/lease program. Fleet determines replacement needs based on a 15-point analysis which considers age, mileage, operating costs and condition. Specific milestones for age or mileage are used as guidelines with actual decisions being based on budget constraints, 15-point analysis and management experience.

117. All divisions use lease/rental vehicles with the exception of Mosquito Control.

Each division leases some vehicles from the Fleet Department with the exception of Mosquito Control. Of the 499 rolling stock vehicles maintained by the County 145 are leased through the Fleet lease/rental program. Leased vehicles are funded through the Fleet Department while vehicles that are purchased directly by a division are funded through that division's budget.

Mosquito Control owns and purchases all of its 79 pieces of equipment. Mosquito Control determines the replacement needs and budgets sufficient capital to purchase equipment entirely through the Mosquito Control budget.

118. Majority of rolling-stock is pickups and SUVs.

LAC grouped each equipment piece into general classifications and determined that over 36% of all rolling-stock is pickups and SUVs. There are 161 various sized pickups and 22 SUVs for a total of 183 vehicles. Other rolling stock includes 45 dump trucks, 41 tractors and various other heavy duty trucks and specialty equipment. Pickups and SUVs are light duty pieces of equipment many of which are in the lease/rental program offered by the Fleet Department.

119. Some specific equipment exceeds the standard useful life.

Comparisons to industry standards revealed 86 pieces of equipment that have met or exceeded the useful life as established by APWA and NAFA standards. These include 19 pickups, 13 dump trucks and 54 other pieces of heavy-duty and specialty equipment. This equates to over 17% of all rolling-stock. Older equipment can result in increased maintenance costs and down time, leading to higher operating costs and less productive time being spent on field maintenance work. Rolling stock age and usage has been compared by LAC in Tables 3-8 through 3-14. Information was left blank where not available.

The administration equipment has been grouped by class in Table 3-8. The current average age of the administration equipment is 5 years with an average usage of 2,431 miles. This is less than the APWA and NAFA useful life and average annual usage for the same equipment class.

Table 3-8 – Administration Rolling Stock Comparison

GROUP	METER	COUNT	APWA AGE	NAFA AGE	AVG AGE	APWA METER	NAFA METER	AVG METER
SUV	M	1	8	8	5	10,000	10,300	2,451

The Construction Engineering equipment has been grouped by class in Table 3-9. The current average age of Construction Engineering's equipment is less than the APWA and NAFA useful life for both classification but the average annual usage is greater for both classifications than NAFA or APWA.

Table 3-9 – Construction Engineering Rolling Stock Comparison

GROUP	METER	COUNT	APWA AGE	NAFA AGE	AVG AGE	APWA METER	NAFA METER	AVG METER
PU 1/2T	M	10	8	8	3	10,000	14,339	13,083
SUV	M	7	8	8	5	10,000	10,300	11,641

The Mosquito Control equipment has been grouped by class in Table 3-10. The current average age of Mosquito Control's equipment varies by classification. Several key pieces of equipment including the Tractors and 1 ton trucks exceed the useful life of APWA and NAFA and the average age of the 36 - ½ ton pickups owned by Mosquito Control is 8 which is the useful life of a ½ ton pickup according to NAFA and APWA. Equipment did not appear to exceed average annual usage of APWA of NAFA comparisons.

Table 3-10 – Mosquito Control Rolling Stock Comparison

GROUP	METER	COUNT	APWA AGE	NAFA AGE	AVG AGE	APWA METER	NAFA METER	AVG METER
DITCH DIGGER	H	1			20			66
DOZER	H	2		13	5			354
DUMP 18YD	H	4	10	11	5	8,000	11,820	737
EXCAVATOR	H	4		12	2			690
GRADALL	H	3		12	9			154
PU 1/2T	M	36	8	8	8	10,000	14,339	6,740
PU 1T	M	1	8	8	2	10,000	14,339	5,333
PU 3/4T	M	10	8	8	7	10,000	14,339	10,893
SUV	M	2	8	8	7	10,000	10,300	7,933
TILLER	H	1			4			98
TRACTOR FARM	H	3		11	20		4,185	137
TRUCK 1.5T	M	1	10	13	3	8,000	7,700	4,667
TRUCK 1T	M	2	10	13	15	8,000	7,700	4,044
TRUCK SPRAY	H	1			19			138
TRUCK SPRAY	M	1			11			8,034
TRUCK TRACTOR	H	1	12	11	21	639	4,185	92
TRUCK WATER	H	1			24			697

The Road and Bridge equipment has been grouped by class in Table 3-11. The current average age of Road and Bridge equipment varies by classification. Several heavy pieces of equipment including the Dozer and 6YD dump trucks exceed the useful life of APWA and NAFA. Light equipment appears to be less than the average useful life as indicated by APWA and NAFA. The 1.5 ton pickups, 1 ton pickup and flatbed crew trucks had an average annual usage that exceeded both the APWA and NAFA average annual usage.

Table 3-11 – Road and Bridge Rolling Stock Comparison

GROUP	METER	COUNT	APWA AGE	NAFA AGE	AVG AGE	APWA METER	NAFA METER	AVG METER
BACKHOE LOADER	H	6	11	12	8	757	616	253
CHIPPER	H	4			4			688
COMPACTOR	H	1		13	1		4,322	77
DOZER	H	1		13	12			550
DUMP 18YD	H	21	10	11	7	8,000	11,820	1,026
DUMP 1T	M	3	10	11	8	8,000	11,820	10,347
DUMP 6YD	H	6	10	11	12	8,000	11,820	533
EXCAVATOR	H	1		12	2			725
FLATBED CREW	H	11	10	11	8	10,000	12,500	655
FLATBED CREW	M	1	10	11	6	10,000	12,500	16,684
GRADALL	H	8		12	6			460
GRADER	H	12	15		7	617		827
LOADER SKID	H	2			2			92
LOADER WHEEL	H	9	13		7	838		430
MIXER	H	9		10	10			33
MOWER	H	1	9		2	665		15
MOWER RIDING	H	11	9		4	665		88
MOWER SLOPE	H	4	9		8	665		124
PU 1.5T	M	3	8	8	2	10,000	14,339	15,997
PU 1/2T	M	16	8	8	3	10,000	14,339	19,043
PU 1T	M	14	8	8	2	10,000	14,339	12,750
PU 3/4T	M	10	8	8	2	10,000	14,339	10,717
ROLLER RUBBER	H	2			24			41
ROLLER STEEL	H	5			7			164
SPYDER	H	2			4			741
SUV	M	3	8	8	2	10,000	10,300	11,800
SWEEPER	H	2	5		3	7,465		961
TAR DISTRIBUTOR	H	2			17			55
TILLER	H	1			7			125
TRACTOR BROOM	H	1			10			112
TRACTOR FARM	H	23		11	7		4,185	256
TRACTOR FARM	M	1		11	4		4,185	403
TRACTOR MOWER	H	4			1			460
TRUCK 1T	M	4	10	13	8	8,000	7,700	10,020
TRUCK BUCKET	H	3			6			1,101
TRUCK CLAM	H	2			3			516
TRUCK FLATBED	H	11	10	11	7	10,000	12,500	561
TRUCK RECYCLE	H	1			6			807
TRUCK SCRAPPER	H	1			11			606
TRUCK TRACTOR	H	3	12	11	11	639	4,185	1,202
TRUCK VACUUM	H	2			8			1,434
TRUCK WATER	H	3			14			332
VAN	M	3	8	8	5	10,000	12,500	7,276

The Solid Waste equipment has been grouped by class in Table 3-12. The current average age of Solid Waste equipment is less than the average useful life of APWA and NAFA with the 18 YD dump classification having an average that is the same as the NAFA useful life. Many classification including the ½ ton pickups, 1 ton pickups, sport utility vehicles and tractor trucks are exceeding the average annual usage.

Table 3-12 – Solid Waste Rolling Stock Comparison

GROUP	METER	COUNT	APWA AGE	NAFA AGE	AVG AGE	APWA METER	NAFA METER	AVG METER
BROOM SWEEPER	H	1	5		8	7,465		75
COMPACTOR	H	4		13	4		4,322	2,176
DOZER	H	7		13	4			1,074
DUMP 18YD	H	3	10	11	11	8,000	11,820	519
DUMP 25YD	H	1	10	11	3	8,000	11,820	2,289
DUMP OFFRD	H	6	10	11	5	8,000	11,820	1,153
EXCAVATOR	H	3		12	4			861
GRADER	H	1	15		9	617		868
LOADER SKID	H	1			1			234
LOADER WHEEL	H	6	13		5	838		1,368
MOWER	H	1	9		7	665		2
MOWER BUSH HOG	H	1	9		5	665		2
MOWER RIDING	H	2	9		7	665		82
PU 1/2T	M	6	8	8	4	10,000	14,339	15,125
PU 1T	M	2	8	8	1	10,000	14,339	14,546
PU 3/4T	M	7	8	8	3	10,000	14,339	10,727
ROLLER RUBBER	H	1			4			161
SUV	M	4	8	8	5	10,000	10,300	14,705
TRACTOR BROOM	H	1			9			69
TRACTOR FARM	H	4		11	8		4,185	258
TRACTOR MOWER	H	1			6			222
TRUCK 1T	M	1	10	13	6	8,000	7,700	28,667
TRUCK RECYCLE	H	1			12			460
TRUCK TRACTOR	M	12	12	11	4	639	4,185	41,708
TRUCK WATER	H	1			6			643
VAN	M	2	8	8	16	10,000	12,500	7,021

The Traffic Engineering equipment has been grouped by class in Table 3-13. The age of the equipment is less than the expected useful life for APWA and NAFA averages. All classification except the stakebed truck exceeds the average annual usage. Since many of the light vehicles travel from the 44 Barn to the Holly Hill Barn daily high usage is expected.

Table 3-13 – Traffic Engineering Rolling Stock Comparison

GROUP	METER	COUNT	APWA AGE	NAFA AGE	AVG AGE	APWA METER	NAFA METER	AVG METER
MINIVAN	M	2	8	8	5	10,000	12,500	12,292
PAINT STRIPER	H	2			16			5,715
PU 1.5T	M	6	8	8	4	10,000	14,339	15,015
PU 1/2T	M	1	8	8	4	10,000	14,339	15,411
PU 1T	M	1	8	8	6	10,000	14,339	23,879
PU 3/4T	M	7	8	8	2	10,000	14,339	14,469
SEDAN	M	2	8	8	1	10,339	11,750	11,058
TRACTOR BROOM	H	1			6			16
TRUCK BUCKET	H	1			13			828
TRUCK PLATFORM	H	1			10			974
TRUCK STAKEBED	H	1	10	11	8	10,000	12,500	422
VAN	M	1	8	8	2	10,000	12,500	13,466
VAN BUCKET	M	1			6			19,130

The Water Resources and Utilities equipment has been grouped by class in Table 3-14. The average age of the equipment is less than the expected useful life as compared to APWA and NAFA except for the backhoe loader and tractor farm which are similar to the APWA and NAFA useful life. The ½ ton pickup, 1 ton pickup, 1 ton truck, van and SUV classifications all exceed the average annual usage compared to NAFA and APWA averages. This is to be expected as the utility assets are located throughout the county and require significant travel. In addition several employees pick up the vehicles from one location and travel to another where they will perform work.

Table 3-14 – Water Resources and Utilities Rolling Stock Comparison

GROUP	METER	COUNT	APWA AGE	NAFA AGE	AVG AGE	APWA METER	NAFA METER	AVG METER
BACKHOE LOADER	H	1	11	12	12	757	616	199
DUMP 1T	M	1	10	11	4	8,000	11,820	7,957
EXCAVATOR	H	1		12	7			216
MOWER BUSH HOG	H	1	9		3	665		3
PU 1/2T	M	22	8	8	4	10,000	14,339	20,467
PU 1T	M	2	8	8	2	10,000	14,339	17,489
PU 3/4T	M	7	8	8	2	10,000	14,339	10,057
SUV	M	5	8	8	2	10,000	10,300	11,942
TRACTOR FARM	H	2		11	11		4,185	71
TRACTOR MOWER	H	2			8			397
TRUCK 1T	M	3	10	13	6	8,000	7,700	22,750
VAN	M	1	8	8	2	10,000	12,500	16,371

120. Almost half of the equipment used by Mosquito Control is 1/2 and 3/4 ton pickups with some specialty equipment including boats, 2 helicopters and one ditch digger.

Equipment utilized by Mosquito Control consists of forty-six ½ and ¾ ton pickups which is 47% of all equipment used by this division. This equipment is leased by other groups but owned by MC.

Mosquito Control also uses some specialty equipment including boats, two helicopters and one ditch digger. This equipment requires specialized skills to operate and maintain.

121. Number of haul trucks may not match the need to move debris.

Solid Waste utilizes haul trucks for transferring waste from the transfer station to the Landfill. Utilizing the data from Table 3-1 and 3-2 it is estimated the number of trips made daily by dividing the total trips by the number of weekdays (261) to get an average of 39 trips made per day Monday thru Friday.

A calculation was done to estimate the number of trips made per day on Saturdays average nine trips made per Saturday. Following the analysis a maximum of eight haul trucks would be required during the week based upon a 90 minute trip and two haul trucks would be needed on Saturdays based upon a 90 minutes roundtrip from the transfer station to the landfill.

122. Solid Waste equipment type and technology may not match work needs.

Solid Waste has specific requirements for laying ground cover over the top of the landfill each evening. Further due to the close proximity to the airport creates additional requirements. Since the capacity is a major determining factor of the life of the landfill along with the remaining airspace it is important that the ground cover is minimized while still meeting Department of Environmental Protections requirements for cover. Currently the depth of the groundcover is determined by operator's estimates and manual measurement. While this method works to ensure the landfill is covered it may result in the use of excess cover since the operator's will over estimate the need for cover to ensure that the 6 inch depth requirement is met.

Technology is available on equipment that is able to measure the grade, depth of cover and compaction with good accuracy. Technology should minimize the use of cover to the exact needs and make the covering of the landfill more consistent.

123. Cleaning is done with VAC trailer by Utility Operations.

Cleaning of utility lines is currently performed utilizing a VAC trailer. This type of equipment is usually utilized as a response piece of equipment in the event of an emergency and no other cleaning piece of equipment is available.

The County currently utilizes the VAC trailer for all line cleaning where the line cleaning is a preventative maintenance task. If performed on a routine basis it can help prevent backups and ensure proper operations.

124. Some groups exceed LAC's database average for equipment per employee for the State of Florida yet the overall ratio average matches.

The average pieces of equipment per staff was calculated by taking the total pieces of equipment (499) and dividing by the total staff (429) which equates to 1.16 pieces of equipment per staff. This is lower than the overall average of LAC's database for other Florida agencies which is 1.47

pieces of equipment per staff. Figure 3-22 provide a breakdown of the average equipment per staff for all agencies in LAC's database and Counties in the State of Florida compared to Volusia equipment per employee.

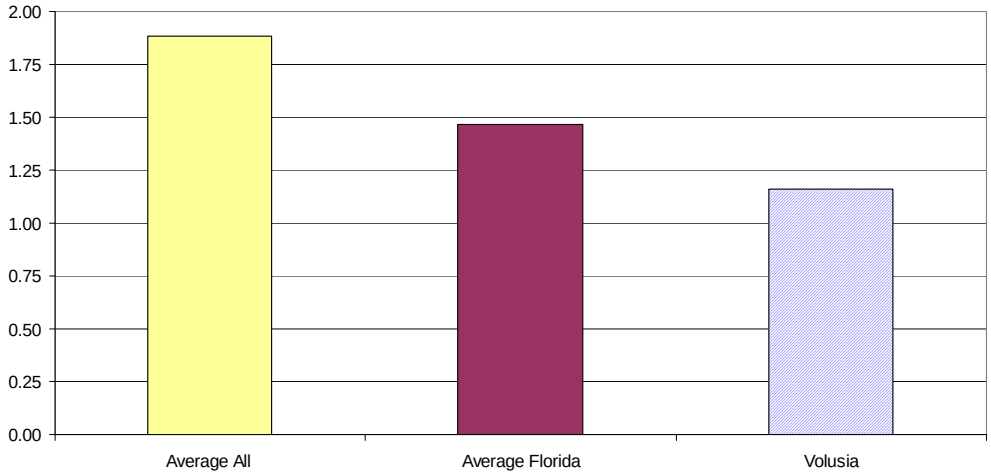

Figure 3-22 – Equipment per Staff

Figure 3-23 provides a breakdown of equipment per staff by division. Although the overall average is lower there are a few divisions that exceed the database average including Mosquito Control and Road and Bridges. Other divisions which have lower average equipment per staff ratio are due to the amount of administrative and engineering staff. Finding 131 will compare the operational staff of the Utilities division per equipment in more detail. Finding 130 will compare the mosquito control budgeted equipment submitted to the state compared to other agencies budgeted information sent to the state.

The Construction Engineering and Administrative ratio are also lower than the average but this is to be expected as the majority of the Staff is engineering or administrative related and does not require additional vehicles to perform work.

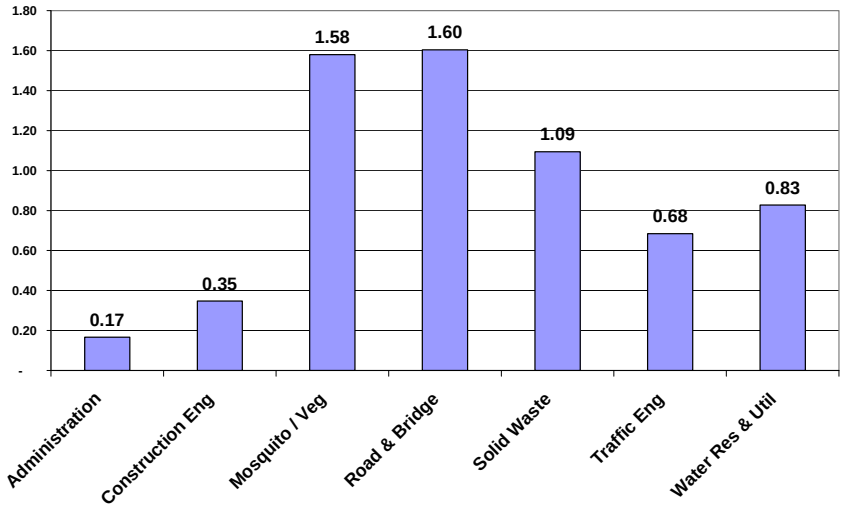

Figure 3-23 – Equipment per Staff by Division

125. Mosquito Control Equipment per staff is similar to other Florida MC agencies in LAC's database.

Comparison of the mosquito control equipment per staff to other agencies utilizing budget information submitted to the state is shown below (Figure 3-24). The numbers differ slightly from above as the current staffing mosquito control and what was submitted to the state differ.

This may be a result of the County incorporation of the ditch crew which is included in the mosquito control division in Finding 129 and has been excluded in this analysis to make a direct comparison to other agencies. The average equipment per staff for other Florida Mosquito Control agencies was 1.69 which is similar to Volusia Mosquito Control average of 1.68.

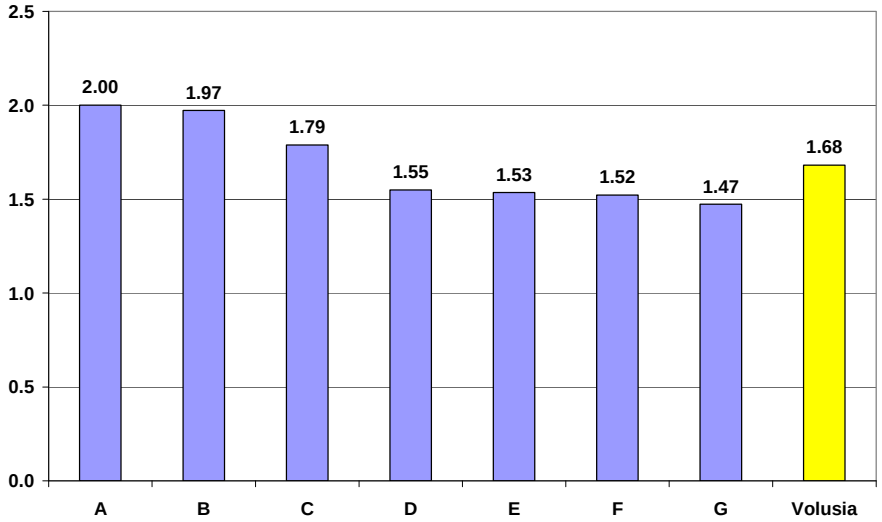

Figure 3-24 – Mosquito Control Equipment per Staff Utilizing State Budget

126. Utility operations equipment per staff is above average of other water agencies in LAC's database and similar to wastewater agencies.

LAC compared the equipment to operation employees excluding the Utility Engineers, Administrative and Billing Staff to other water and wastewater agencies in LAC's database (Figure 3-25). The average equipment per staff for water operations in LAC's database was 1.11 and for wastewater operations in LAC's database 1.18. The overall average for Utility operations was 1.17 which is within the range of operations for other Utility agencies.

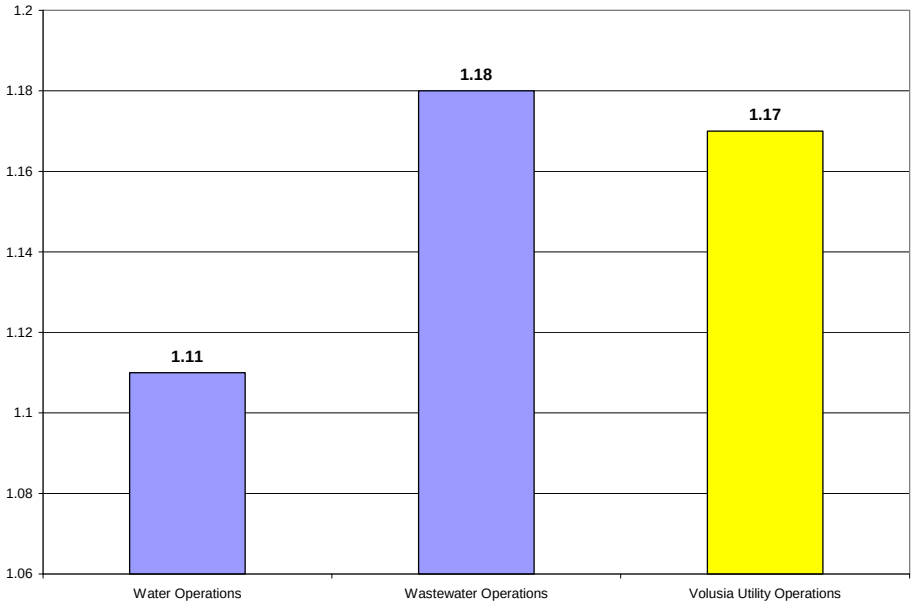

Figure 3-25 – Utility Operations Equipment per Staff Utilizing State Budget

127. Helicopter usage in Mosquito Control is less than LAC's Florida average.

LAC compared the average annual flight hour per aircraft compared to other Florida Mosquito Control agencies (Figure 3-26). The average annual flight-hours per aircraft for other agencies in LAC's database are 166 hours. The average annual usage per ship based upon June 2005 through 2006 is 125 hours. This is based upon a total of 241 hours total between the County's aircraft being flown during June 2005 and June 2006. Low usage impacts the hourly cost per flying a helicopter.

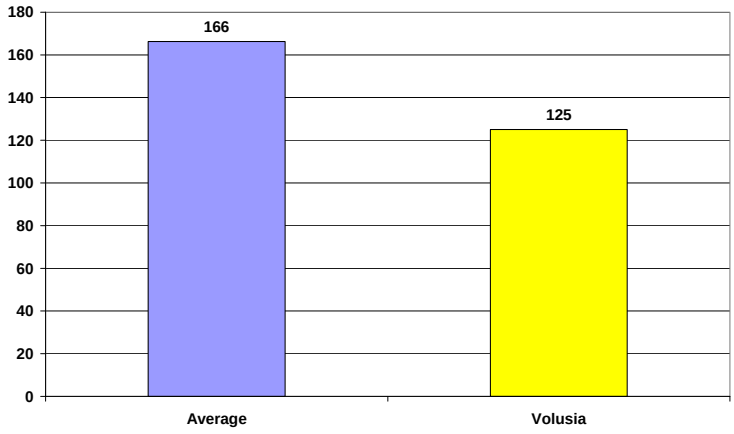

Figure 3-26 – Helicopter Usage Comparison

128. Pilots perform minimal maintenance on helicopters as County has 1.5 mechanics performing that function.

Mosquito Control has one full time and one part time mechanic devoted solely to the maintenance of the two helicopters. Maintenance is performed before and after each flight by the

pilots, and a mechanic and part time mechanic perform routine maintenance at intervals specified by the aircraft company. Pilots assist when needed, but usually only perform minimal maintenance.

129. Volusia County's average flight hours per helicopter are similar to other Florida MC County operations, yet most of the flight hours are for non treatment functions.

Based upon information provided, LAC reviewed the 241 hours of flight time that occurred between June 2005 and June 2006. The flight hours were divided into 4 separate categories including administration, inspection, larvicide and adulticide. The largest amount of time was spent on administration (99 hours) and inspection (96 hours) with the remaining hours spent on larvicide and adulticide. Figure 3-27 outlines the hours by function. The largest function was administration which the County indicated included work performed for others such as flights performed for other County Divisions which may include activities such as manatee viewing or flight over the County.

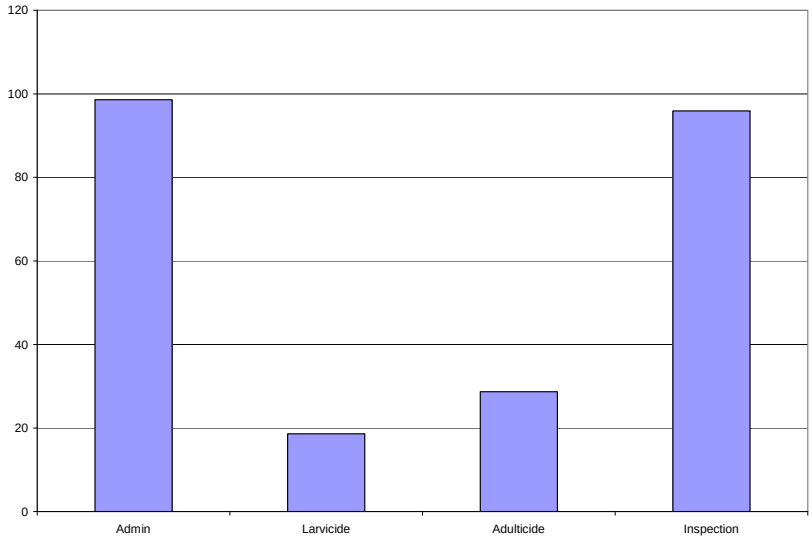

Figure 3-27 – Helicopter Usage Analysis

130. Mosquito control estimated cost per flight hour for Volusia ($2,200-$2,600) is similar to range of other agencies in LAC's Florida database $1,960-$2,540

The computed the cost per flight hour for the Mosquito Control division as $2,200 - $2,600 depending on the actual flight hours used. This cost is based upon the salaries for the airborne inspection supervisor, the pilot, the aircraft mechanic and the part-time mechanic multiplied by the 163% overhead calculated by the fiscal officer. This information was combined with the total fuel cost, insurance cost, annual depreciation of the aircraft and ground support and then divided by the 241 flight hours that occurred in June 2005 through June 2006. The calculation excluded material cost which would make the cost per hour higher if included. The County has identified the actual hours of flight time was 310 hours which reduced the cost per flight hour to $2,200 per hour excluding material costs. The 310 flight hours were unable to be verified by LAC.

Comparing the cost per flight hour to other agencies in LAC's database the County appears to be higher. The agencies in LAC's database had a range of $1,960 to $2,540 per flight hour of helicopter use. All agencies that the County was compared against were located in Florida.

131. Significant amount of work is reimbursable with Mosquito Control effort being 48% and Road and Bridge being 16% of their total operations expenditures.

Road and Bridge and Mosquito Control perform a significant amount of work for others. $1.7 million in reimbursable revenue accounts for 15% of the $10.7 million operational and personnel expenditures for Road and Bridges. Reimbursable work for mosquito control ($1 million) accounts for 48% of total operational and personnel expenditures ($2.1 million). Outside work had a significant impact on workload as these divisions must devote resources to performing work for these outside clients. Both divisions perform work for cities and stormwater. In addition mosquito control performs work for other agencies.

132. Asphalt overlay contractors effort requires support by the Road and Bridge Division.

Pavement overlay is contracted for County roads. The contracts do not include the effort for restoring shoulders, filling drop-offs and cleanup of debris. Due to this Road and Bridge has a County-wide crew that is responsible for cleanup and shoulder restoration. This is a major effort as minor shoulder repair alone accounts for 21% of all work requests for Road and Bridge and was the number one most requested activity.

Directing

133. Work identification varies by division using staff experience.

Work is identified throughout the County in various ways through citizen complaint, other department/agency requests, routine cycles or staff experience.

Citizen complaints are received throughout Public Works by call, email or online as is the case for Solid Waste. The complaints are logged in various systems such as the TIS system in Road and Bridge, the AllMax system for Utilities, the P3 system for Traffic, an MS Excel spreadsheet for Mosquito Control with an MS Access database for vegetation control and the Waste Management system for Solid Waste. Complaints are inspected by supervisors and then assigned to work, except for Solid Waste where the complaint is addressed and forwarded to Waste Management if applicable.

Other departments, divisions and agencies will request work to be done for Road and Bridge, Utilities, Traffic and Mosquito Control. The requests are logged in each division's respective system. Sites are inspected and work is assigned as needed.

Routine cycles generate work for Traffic, Road and Bridge, Solid Waste and Mosquito Control. Traffic has set up routine cycles for inspecting signs in zones. Road and Bridge uses routine cycles for tree trimming. Mosquito Control has certain ditches on routine spraying cycles. Solid Waste has a daily routine to add cover at the end of the day.

Much of the work is also identified in the field by staff experience. Staff working on other work will document any other work in the field that needs to be performed and will perform immediately if warranted by an emergency, or will finish the existing job and then work on the other identified work.

134. Cyclical routines have been established for some activities.

Cyclical routines have been setup for Road and Bridge, Mosquito Control, Traffic and Solid Waste. Road and Bridge has set up cycles for tree trimming and for dirt road grading. Tree trimming is around a three year cycle and the grading cycle is approximately ten working days for each road. Traffic has routine zones for signs. Each month a zone is inspected for all signs to indicate which signs need maintenance, repair, or replacement. Signals also have cycles for each six months. Mosquito Control uses routines for vegetation spraying for contract work and for some ditches. Solid Waste has a daily routine cycle for adding cover to the landfill at the end of each day.

135. Some routines exist yet most work planned is based upon staff experience and citizen request.

Though the County has created various routine cycles, most of the work generated is based upon staff experience and citizen request. Road and Bridge received 3,210 work requests in FY05-06, which accounted for most of the work performed. Utilities does not perform cyclical routine maintenance on the collection system nor the distribution system and all work is generated either by experience of the staff or by citizen complaint. Traffic has routines for markings, signs and signals, but much of the work is generated by citizen complaints. Mosquito Control adulticiding is generated by either citizen complaint or by staff inspections in the field.

136. A separate work order system and work tracking process occurs by division

Each of the work processes outlined in the Section 2 indicates the work tracking and work order systems vary by division. Road and Bridges utilize the TIS system for work orders and work tracking. All work is tracked in the TIS system.

Solid Waste utilizes two separate work order systems (TIS and Waste Management System). The process for each work order varies by the system that the work order is in as the Waste Management work orders are to be performed by Waste Management. Work performed by heavy equipment operators and all other employees is not recorded.

Water Resources and Utilities utilize the AllMax system for tracking orders. Work for operators is not entered into the system unless a specific work order is made. The Tokay system is used for monitoring installation and inspection of backflow devices.

Mosquito Control work tracking varies by supervisor and the work order process is a manual process that is tracked on an MS Excel spreadsheet. The herbicide work is traced in the in-house

developed HERB database. The Ditch crews work is tracked and projected in P3 and the other supervisors and inspectors use a series of manual and MS Excel documents for tracking work.

Traffic engineering utilizes P3 to enter work orders and to track daily work. Daily work and work order information contained duplicate entry and is difficult to retrieve and view without exporting data.

137. Most Road and Bridge requests are shoulder repair, potholes, trees and grading

Work requests for Road and Bridges have been for a small number of activities over recent history. In FY04 Road and Bridge accumulated 4,106 and 47% (1,909) of the requests were for shoulder repair, potholes, trees, or grading. In FY05 of the 3,210 work requests submitted by September 18, 56% (1,794) were for shoulder repair, potholes, trees, or grading. This indicates that these are the major focus of customer complaints and issues.

Controlling and Improving

138. Each division handles work tracking differently. All groups complete daily timesheet for payroll.

Each division has a different method for work tracking. Road and Bridges utilize TIS and tracks all work including travel time, accomplishment and activity for labor, equipment and materials. Water Resources and Utilities tracks labor and material on work orders but does not account for equipment. Mosquito Control tracking varies by supervisor with some data being stored in P3, MS Access, or MS Excel. In addition manual and automated data is compiled into monthly reports to the Director. Solid waste tracks work order but does not account for work by activity.

While each of the methods of work tracking exists all divisions account for time through payroll utilizing the same methods. Information is for hourly purposes and does not contain accomplishment or productivity information.

139. R&B Work tracking data is entered into TIS system by administrative staff at three of the four yards.

Work tracking data for the Road and Bridges division is entered by administrative staff at 3 of the 4 yards including the 44 Barn, Holly Hill Barn and the New Smyrna Beach Barn. The engineering assistant or part time staff enters the work at the 44 Barn and the office assistant located at the Holly Hill or the New Smyrna Beach barns enter the work for the employees that are staged out of that location. Work tracking at the Osteen Barn is entered by staff at the 44 Barn.

140. Work Tracking in Mosquito Control varies. Some supervisors partially track work in MS Excel, some use Primavera or MS Access.

Mosquito Control work tracking varies by supervisor. The supervisor responsible for herbicide application developed an in house system to track work performed. Information contained in the system includes labor, equipment and material used and work accomplishment such as acres.

The ditch cleaning supervisor utilizes P3 to track work. P3 is a project management system and all work is tracked by project including labor, equipment and work accomplishment. Other supervisors and inspectors have MS Excel spreadsheets that are used for tracking work and billing purposes but contain limited data.

141. Database systems are utilized for documentation of actions and response to requests.

In general data systems are utilized as a response to requests and for documentation of work. A manager or supervisor will request information and then a document will be produced. In some instances reports are created monthly. While data exists it lacks linkages that would allow the County to review all work performed by Public Works. The systems are not established to compare to the planned budget which would allow for further analysis of work to determine if the right work was being done cost effectively. Figure 3-28 outline the general use of information from systems.

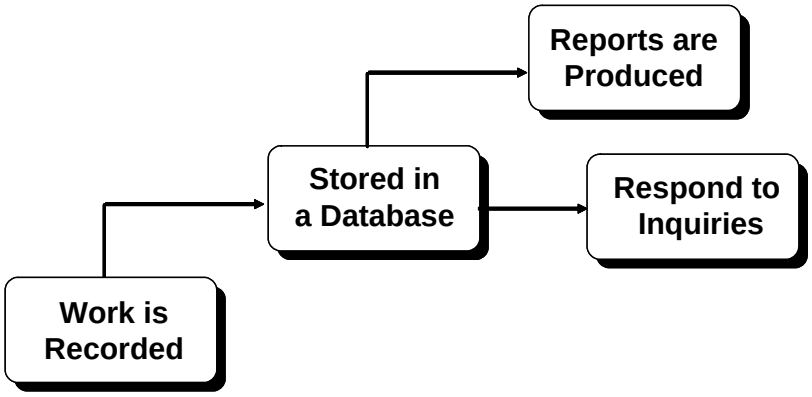

Figure 3-28 – Work tracking uses.

142. Public Works has monthly project status report based on work done yet format various by each group.

One of the major uses of data tracked by the County is for compilation of monthly reports to the Director of Public Works. Each division produces a monthly report in MS Word. The documents are compiled manually from data within the systems or by hand. Data contained in the reports varies by division and function.

The format also varies slightly. Providing data to the Director is a good practice that can allow the Director to make better management decisions. Currently the format of the data makes it difficult to utilize for managing decisions and implementing improvement.

143. Work Management Systems for Road and Bridges track basic management components but technology is outdated.

Road and Bridge tracks data in the TIS system. The Transportation Information System (TIS) was developed in house specifically for Road and Bridge operations and has evolved since the initial use. The system tracks work requests and work orders as well as work performed. Labor, equipment, materials and accomplishment are recorded for specific areas or locations and

information on in use hours and out of yard hours for equipment are captured for reporting. TIS also captures whether work is FEMA related for later reporting on work associated with declared disasters.

The TIS system works and is functional, however the DOS based system is outdated technology. The system does not use a graphical user interface and requires manuals for use. Data can be extracted, but not directly from the system and requires assistance from the IT department.

144. Road and Bridge data is exported to other formats for manipulation.

Data from the TIS system is exported by the IT department into other formats. Data is exported from the backend into MS Access databases and MS Excel spreadsheets and is then sent to administrative staff. The administrative staff run reports on the data and can then perform manipulation to create reports such as the comparison of work orders opened versus closed for any given time period. Staff also uses this method for FEMA reporting and performing unit cost analysis and analysis for the Dirt Road Program. Data has been extracted for use in project worksheets.

145. Lengthy manual process exists for accounting of Mosquito Control work requests and County's system does not include cost and productivity. Reimbursable work tracked separately in MS Excel.

Mosquito Control tracks service requests through a lengthy manual process. In addition to tracking requests manually, time is spent compiling and tallying information for monthly reports. While time is incurred tracking work requests, there is no ability to use the manual information to track cost or productivity of work that has been performed by inspectors and their staff. To perform billing for other work, the data must be entered into separate MS Excel spreadsheets.

146. Traffic Engineering process is complex and staff is performing duplicate data entry in system (P3).

Traffic Engineering utilizes a complex process for work tracking. The process can result in delays in billing to contract Cities. There are multiple forms that must be completed for work tracking including work order forms, work tracking forms and travel logs.

Each form contains similar or duplicate information to the other forms and all are entered into the P3 system separately. This causes duplicate entry of work in the system. In addition once all work has been entered data is often exported to MS Excel or other formats to assist with Billing.

147. P3, which is used in both traffic and MC main function, is project planning not work management.

The County purchased a project management system Primavera (P3) to assist in managing projects. The system was implemented over five years ago and has become a system for tracking cost and managing work in several groups in Public Works. The system is used by traffic and Mosquito Control along with spreadsheets to produce cost information.

The P3 system is designed for large projects that have interrelated tasks and projects such as vertical construction of a large multi-story building or major interchange, key bridge or a new city where many components, tasks, materials and deliveries are interrelated.

Though the P3 tools can track cost, it is normally used for a large and complicated system for managing projects rather than routine maintenance work tasks. It is being utilized by the County in a manner that it is not intended.

LAC has no clients in a nearly 100 plus database that are using the tool in the manner the County is applying this tool. None of the seven Counties in the LAC database utilize it in this manner even though some use it along with project management tasks. P3 requires considerably knowledgeable support staff to manage the tool when utilized, so the project size must warrant this overhead cost and support time.

148. Two different systems are used to track complaints. One for trash complaint with Waste Management Contractor and the other is mainly for compliance issues.

Solid Waste utilizes two separate systems for work order tracking. The first system is the TIS system which is the same system utilized by Road and Bridges. The system has not been modified to meet Solid Waste's needs and is therefore used mainly by the compliance office for tracking compliance issues. The other system is an MS Access based system that the County can access utilizing the web. The system is for work orders that are related to the customer's collection of trash by Waste Management Contractor. Waste Management has access to the database and is responsible for completing the request. The County monitors the database and contacts citizens to ensure Waste Management is performing its required functions.

149. The AllMax system has considerable information but difficult to retrieve by activity, summary or management data.

Utility operations utilize the AllMax system for tracking work order completion and billing. The County tracks labor and materials for each work order created. Although the information is within the system it is difficult to retrieve. Data can be pulled up for one work order but summary data or an annual report data is not available. In addition although an activity is entered for each work order information is not available for how much work was spent on one activity. Information for the annual report must be compiled outside AllMax from data that is within the system.

150. Material Control and tracking varies by division.

Material Control and tracking varies by division. Road and Bridges have a warehouse manager that is responsible for checking materials in and out daily utilizing the TIS system. Utility operations utilize the AllMax system for material control. Major inventory items are stored at the 44 Barn but several of the plant locations have small inventories of supplies with limited quantities. Mosquito Control tracked chemical usage through MS Excel with the exception of the herbicide crew which uses the HERB database. Traffic utilizes P3 for monitoring material usage and Solid waste does not have a material system.

While most divisions have a process in place for material tracking none of the systems are linked and it is difficult to look at material usage Countywide.

151. Road and Bridge Department is performing some components of best management practices but lack specific automated linkages to allow for continuous improvement.

The Road and Bridge Division currently perform many best management practices components. Work activities, resource cost for labor equipment and material have been established. Some planning goals are set based on budgets, past history and desires of staff for programs such as grading, tree trimming and dirt road paving. Service requests are documented and work orders are issued from the TIS system. Some of the work is scheduled in advance as in the case of special projects. Work is tracked to a general area or location for each day.

Some of the components in planning including activity definition, service and work standards are established only for a couple of activities. A complete work plan is lacking for most activities and there is no linkage to budget process. There is currently no process in place for estimating work placed on needs and a calendar of all work planned for the year is lacking. In the directing phase, most of the effort determined a day or two in advance. A work backlog system is available in the current system, but it is rarely used with most work being performed in order of when the work was received. Though work tracking is performed, there is no baseline in the system to compare planned unit cost, productivity, or overall cost. To perform a unit cost analysis data is transferred from the TIS system to MS Access.

Road and Bridges has some management system processes that exist, yet most are not linked and many steps are missing from best management practices as outlined in the Section 2 Figure 2-102.

152. Mosquito Control Department is performing a few components of best management practices mainly on a "one on one" verbal basis.

Mosquito Control is currently performing a few or the best management practice components. Work activities and resource costs for labor, material and equipment have been established as they are used to bill others. Some planning goals are established for contracts using historical work information for vegetation spraying. Some service requests are stored in varying systems based on function, such as mosquito complaints and vegetation complaints. Work is tracked to various locations for vegetation spraying and to general projects for heavy equipment.

Other components in planning including activity definition, service and work standards are established for activities on a verbal "one on one basis" and are not documented. A complete work plan is lacking for most activities and there is no linkage to the budget process. There is currently no process in place for estimating work placed on needs, and a calendar of all work planned for the year is lacking. In the directing phase, work is scheduled in advance for adulticide spraying and some billable work, but most work is scheduled a day or two in advance. A work backlog system is unavailable in the current systems being used. Though some work tracking is performed, the focus is on billing and little management information exists for determining productivity, accomplishment and unit cost and there is no baseline in the system to compare.

Mosquito Control has some management system processes that exist, yet most are not linked and many steps are missing from best management practices as outlined in the Section 2 Figure 2-102. Management tools and processes vary by supervisor.

153. Traffic Engineering Department is performing some of the components of best management practices mainly on a group by group basis.

Traffic engineering has many of the basic management system components in place. In general they have established work activities, resources cost for labor, equipment and materials are established. Using some historical information and desires of staff, basic work program goals are setup for some activities such as LEDS installed and PMs conducted. An effort is made to document external request and track those using Primavera (P3. Further, some groups in signs are attempting to schedule work up to two weeks in advance). All groups with traffic do track by general activity and account for resources used in a general location.

Yet some of the other items in planning including activity definition, service and work standards are established only for a couple of activities. A complete work plan is lacking for most activities and there is no linkage to budget process. There is currently no process in place for estimating work placed on needs and a calendar of all work planned for the year is lacking. In the directing phase, a few groups schedule work with most of the effort determined a day or two in advance. A work backlog system is unavailable in the current system being used. Though some work tracking is performed, the focus is on billing and little management information exists for determining productivity, accomplishment and unit cost and there is no baseline in the system to compare.

Traffic has some management system processes that exist, yet most are not linked and many steps are missing from best management practices as outlined in the Section 2 Figure 2-102. Further, many of the processes vary by supervisor for planning, scheduling of work.

154. Solid Waste Department is performing some components, which are mainly those mandated management practices.

Solid Waste has some of the basic management system components in place as many are mandated for environment concerns. In general, Solid Waste has established resource costs for labor, equipment and materials in addition to having certain service levels for coverage and loads mandated. Using some historical information and staff desires of basic work along with consultant support, program goals are projected for accomplishment. An effort is made to document external requests and track those using several systems. Further, working hours and employee assignment is scheduled several weeks in advance. All groups track by hour and account for resources used in a general location.

Yet some of the items in planning including existence of activity and their definition, service and work standards are lacking. A complete work plan is prepared for anticipated units but there is no linkage to budget process. There are currently no processes in place for estimating work placed on needs and a calendar of all work planned for the year is lacking. In the directing phase, a few groups schedule work with most of the effort determined a day or two in advance.

A work backlog system is unavailable in the current system being used. Though some work tracking is performed, the focus is on costing and employee tracking and little management information exists for determining productivity, accomplishment and unit cost and there is no baseline by activity in the system for comparison.

Though solid waste has some management processes in place they lack linkage and many steps are missing from best management practices that are outlined in Section 2 Figure 2-102. Management tools and process vary by supervisor.

155. Water Resources and Utilities Department is performing a many components of best management practices often on a "one on one" verbal basis.

Water Resources and Utilities have many of the basic management system components in place. In general they have established work activities, resources cost for labor and materials are established. Some performance measures have been established in the fiscal budget. A system is in place for tracking and monitoring.

Yet some of the other items in planning including service and work standards are established but have not been linked to a work plan. A complete work plan is lacking for most activities and there is no linkage to budget process. There is currently no process in place for estimating work placed on needs and a calendar of all work planned for the year is lacking. In the directing phase, most of the operators work is routine but there are no PM cycles established for the distribution or collections crew. A work backlog system is unavailable in the current system being used. Though some work tracking is performed for labor and materials, the system is difficult to retrieve data from, is not being utilized to track equipment and does not contain accomplishment, unit cost and there is no baseline in the system to compare planned versus actual work to.

Water Resource and Utilities has some management system processes that exist, yet most are not linked and many steps are missing from best management practices as outlined in Section 2 Figure 2-102.

156. Construction Engineering Department is performing many of the relevant components of best management practices with a combination of tools.

Construction Engineering is based on projects and not activity based as the other operations groups. Currently the systems in place are mainly for tracking work. There is a general schedule that is prepared based on an actual plan by activity. There are internal tools used on an ad-hoc basis for scheduling of work. The work done is tracked differently in various subgroups such as survey, PM, ROW and Construction. The focus is on documentation of accomplishment. The main work element is completion of various components of a project such as road widening or overlay. Some management information exists for determining accomplishment and overall cost and there is little baseline information in the system for comparison.

Though Construction Engineering has many project management systems processes, most are not linked and many steps are missing from best management practices as outlined in the Section 2 Figure 2-102. Management system tools and processes vary by supervisor.

4 – Recommendations

SECTION 4
RECOMMENDATIONS

This section documents specific recommendations in detail. The recommendations are organized into four sections beginning with general improvements and following with the fundamental management functions (planning, organizing, directing, and controlling/improving) divided into three sections.

The ninety-one (91) recommendations are not listed by priority, but follow an implementation sequence after the general recommendations. Further, the recommendations are related in many cases so that the benefits indicated may not completely occur without the prior recommendations being implemented.

The County's Public Works maintenance operations have many positive features that are in place, as outlined in the previous section. The following recommendations are structured to help improve the existing operations.

General

1. Annually select and utilize capable employee teams to implement improvement processes.

The County employees were observed to have implemented and utilized many positive and innovative ideas that have improved operations. To allow the improvement process to be effective, further use of employee involvement can be a key component in the future implementation of recommendations.

Employee support and buy-in can be enhanced by establishing capable employee teams that will work to provide ideas and information during the development of recommendations that have been outlined in this report, but allow for some flexibility based upon employee input.

2. County should establish and plan operations for a combination of both rural and urban communities and align resources, processes, and work methods to match those demographics.

The County is in transition from a rural community to a more urban one with the resulting demands upon resources including increased service and quality levels. The County should plan work and standards to meet the demands and service levels of an urban community.

Many service levels and quality levels will need to change and the County should align resources and processes to match a new work plan that has those needs. This will focus the County in its work methods, level of service and resources to match the current and future demographics of its residents. This will require an effort to refocus Public Works systems, processes, and work methods.

3. Assign staff to yards or facilities based on work needs, not just historical experience. Further, employees should report directly to the facility where they work such as signals and the south east drainage crews. Midge crew should be stationed closer to Lake Monroe and ditch crews should be stationed closer to their work.

Staffing has been allocated to yards or facilities based upon the historical experience of the County, supervisor judgment and in an attempt to balance resources between yards and crews. Many staff are staged at yards different from where the majority of their work effort is located.

Further, a comparison of staff per 10 road miles, including the Countywide crews, which are staged out of the Northwest yard, indicates staffing at all four Road and Bridge yards ranges from .7 to 1.2. This large variance demonstrates that staffing differs among the yards.

For example, there is a Southeast drainage crew that stages out of the Southeast barn, but they travel to the Northwest barn to perform work. This would have even a greater variance in the staffing per road miles number if the Southeast drainage crew was included in the Northwest staffing. Also, the drainage crew can expend 1-2 hours traveling to the Northwest yard prior to even beginning their work and must terminate work early to travel back to the Southeast yard. For situations such as this even if it is only a six month basis an attempt should be to station staff closer to work.

Labor and equipment resources are being assigned without direct consideration of work load. The County should staff yards based upon actual work needs determined by the amount and type of infrastructure assets, desired service levels, defined work methods, and related productivity and have crews report directly to the barn where work is assigned.

Another example, traffic crews are often assigned to yards, but work is done mainly at other yards. 1-2 hours a day is expended by five employees traveling to the yard by the traffic crews who initially check in at the Northwest Road Yard daily, and then drive to the Holly Hill Yard for other assigned jobs.

Assigning traffic staff at both east and west areas based on workload would eliminate this unnecessary travel. Traffic staffing should be determined based upon assets, maintained signals, intersections, and required service levels.

A third example of this is when the Midge crew reports to Daytona Beach daily and then travels to Lake Monroe, which can be over 2 hours of travel roundtrip. Travel time can be reduced by staging employees closer to the work such as the Southwest Road and Bridge facility in Osteen. The appropriate space, infrastructure and facilities would need to be provided at this location for the Midge Crew to effectively perform its work. Other opportunities may exist and by assigning staff close to the work load, more work time can

be provided with less travel. In instances where the crew would be performing lab work or analysis for the day, the midge crew should then report to the New Smyrna Beach yard on those days only, once both the Daytona and New Smyrna yards have been consolidated.

In making assignments to yards, management can attempt to minimize personal impacts yet reduce this travel on County time. Conservatively 5-8 FTEs of work Countywide could be available by eliminating this unnecessary travel.

4. Stage equipment and materials close to the job site rather than yards, such as grading and MC ditch work, thus saving travel time.

Travel times have a considerable impact on the performance of some activities. Performance impact is compounded with heavy equipment (graders, loaders, etc.) which are often required to complete the task. Transporting the heavy equipment utilizes slower transport units that further increases travel time. To minimize the delays, staging areas close to the job site should be identified and have opportunities established.

Staging areas closer to the job site will minimize increased travel time and allow more time to be spent on productive activities. Heavy equipment, such as graders and excavators used by Road and Bridge and Mosquito Control ditch crews, are prime examples of equipment operations where this would work. Currently, some operations within the County such as Mosquito Control are attempting to stage equipment close to the job site and are already performing this practice for some heavy equipment when cleaning ditches. It was observed that many opportunities exist for this staging in the Northwest road barns exist for the dirt road program.

5. Mosquito Control should allocate and assign resources to the west side and utilize existing road barns for work staging.

The Mosquito Control Division currently has two separate yards; both are located on the eastern side of the County within the District's mosquito boundaries. Yet, Mosquito Control performs 20-30% of its work on the western side of the County through various contracts.

A specific crew is not currently dedicated to performing work on the westside of the County, and as a result a variety of personnel are traveling excessively. Work needs warrant a dedicated crew to the Westside. By stationing one crew on the west side travel time will be reduced for the remaining crews.

Resources should be allocated utilizing the County road yards to eliminate and reduce travel time and increase the number of productive hours. It is anticipated that this could result in 2-3 FTEs of saved travel time available for work.

6. Consolidate two mosquito control yards into New Smyrna Beach yard.

The two Mosquito Control yards on the east side of the County should be combined into the lower cost rental facility in New Smyrna Beach. This yard not only houses the aerial operations but is also in an area that has much less traffic congestion and allows for ease of staff movement.

The County has existing plans to consolidate the Daytona Beach and New Smyrna Beach Facilities onto one site at the New Smyrna Beach yard. Based upon observed work and the cost to lease land at the Daytona site, the County should transition staff from the Daytona site to New Smyrna Beach. This will reduce the cost to lease land, allow for ease of communication, and eliminate some redundant equipment while having a minimal impact on travel time and may actually reduce overall travel.

7. Define Department wide "on call" policy and cross train staff to minimize the need for staff on call. Link response requirements and use of take home vehicles.

Currently each division handles their own internal "on call" policy. There are 12-13 employees that may be on daily on-call for off-hours response. These requirements and procedures are based on historical practices that lack complete documentation and any formal approval by the Department.

Ability to optimize this could occur and still have the adequate resources to meet needs in an orderly manner during non-working hours. The County should define and standardize an "on-call" policy and then cross train employees between divisions to reduce the number "on call."

There may be certain instances where specific training is needed for on-call staff to allow for some cross training of duties such as traffic and wastewater/water. It is necessary to have at least one person on-call from these divisions with personnel cross-trained for other divisions. This should only occur if cross-training is determined not to be an option and the reasons cross training is unavailable to the other divisions for these department should be clearly stated and documented.

Further, take home vehicles for all divisions should be linked with the employee who will be potentially responding to an emergency during non-working hours.

The documentation of these processes should occur. The benefit to the County will include optimizing on-call staff to potentially reduce the need for the number of employee's on-call and standardizing the policy for all groups.

8. Minimize the number of systems and implement a Countywide Computerized Maintenance Management System (CMMS) for work planning and managing. Eliminate "in-house" systems and utilize only off the shelf systems (OTS).

Further, CMMS should have the ability to plan and manage all work including ability to plan and monitor special events.

Sixty three (63) systems were identified throughout the County with other additional systems having a high probability of existing though not specifically identified. These systems vary and are difficult to compile data and are in various states of automation. The County should minimize the number of systems used and standardize systems throughout Public Works.

The County should optimize the number of systems that will meet the needs of each of the Pubic Works divisions. It may require multiple systems, although a maximum of 4-5 systems should be sufficient to meet the County's needs. This will allow data to be compiled easier among all divisions and allow information to be tracked and stored in a similar format for all divisions, which will aid in the use and training on the system(s). This reduction of databases should create labor resources to operate and utilize the new systems although some training and skill set enhancement may be required.

In addition, the County should eliminate all "in-house" developed systems. While some of the existing "in-house" systems are beneficial and were developed to meet a specific need, there is little technical support or understanding by other personnel on how to use the data. The potential that the original developer of the system could depart the County creates a considerable risk that could result in the loss of functional operation of systems understanding and data. Plus, the cost to maintain such systems is expensive.

Further, the County is impacted by special events throughout the year and should have a system in place to determine and document this impact. The new CMMS should also have the ability to plan and manage work for these events. This will allow the County to better determine, predict, and plan the resources and costs that are required for these events.

9. Replace AllMax system with new CMMS and ensure that new system allows for easy retrieval and access of data. Link or replace the Tokay system.

The Utilities Operations group is storing key management operations information related to the distribution and collections crew in the AllMax system. Information can be reviewed by individual work order, but cost reports by activity are difficult to obtain and have yet to be produced.

The new CMMS will have specification that outlines work order capabilities. Information in the new CMMS should allow for easy access and retrieval of data including summary reports that have information by activity, productivity, and accomplishment.

The utility operations group manages their backflow devices information through the Tokay system. Due to the unique function of this system and the necessity of the system, it may be difficult to find a CMMS that can perform all of the previously mentioned functions as well as track and monitor backflow devices. The County should attempt to

find a CMMS that can replace the functions of the Tokay system, if available, and can meet other required needs of the CMMS. If a CMMS that can replace the Tokay systems functions can not be selected through an RFP process, the County should consider linking the Tokay system to the CMMS as an effective alternative.

10. Integrate manual log with GPS system and new CMMS.

All County employee assigned vehicles must complete a manual truck log sheet with the location of the vehicle at stops on a daily basis. In addition many vehicles have been outfitted with GPS tracking systems with future implementation of GPS in all Public Works vehicles.

There is some duplicate effort between the manual truck logs and the GPS tracking. Once the County has implemented a CMMS with work tracking, the manual truck log should be integrated into the tracking for the CMMS. This will eliminate the duplicate efforts of completing the manual log which can cost the County valuable productive time when each employee with a vehicle spends approximately 10-15 minutes each day completing the form.

11. Improve telemetry to allow for both monitoring and control at all sites. Establish system that eliminates "ghost" calls for "on call" utilized staff.

The County has an existing telemetry system which allows for monitoring at many of the remote sites. In addition, remote control of functions is limited. SCADA or Supervisory Control and Data Acquisition technology can assist to manage response and emergencies issues through better monitoring, control, and tracking. In addition, telemetry can help reduce the need for staffing by allowing remote operations during the evening and weekend hours. These control functions will allow operation of pump stations and other assets that can be used remotely to isolate and control issues which will eliminate and/or minimize traveling to a site.

Further, the County's existing system currently creates "ghost" calls or calls from items such as power loss or fluctuation. These calls are alarms that County staff must confirm and may create the need for a site response. This technology causes employees to needlessly respond, take the time to confirm, and potentially travel to sites, thus utilizing call out pay for an unnecessary alarm. Obtaining additional or more advanced telemetry technology and software can eliminate these calls.

12. Accurate and specific cost for providing utilities support for adjacent unincorporated areas next to cities utilities as well as outlying remote areas should be identified.

The County currently bills different rates based upon east side or west side of the County. The cost is generally higher in the east side of the County where the water receives a water-softening process.

There is no billing cost difference for customers that live in outlying areas versus customers that live in urban areas near the regional plants, yet it costs more for the County to travel to these outlying areas. It is currently difficult to determine what the exact amount the additional cost is for a geographical area using the Allmax system.

The County should utilize the new CMMS to determine the cost of providing services to urban areas versus outlying areas and determine if those costs are being recovered by the appropriate customers.

13. Eliminate small isolated package facilities and establish policy and requirements for new subdivisions. This will ensure any new system operations are financially feasible with quality criteria established to minimize creation of isolated high maintenance facilities.

Outlying systems that are independent of existing water facilities are expensive to operate and maintain as well as create considerable travel time. For instance, package plants are expensive for the County to maintain and operate as they not only have mandated onsite hours, but the travel to the plant often exceeds the time to perform the operations effort.

Currently, the County's existing policies do not set any financial requirements for package plants that are being created in new developments and in fact encourage these plants to be created in lieu of connection into the County's utility system.

The County should eliminate or minimize the isolated package facilities. In the future a policy should be established that outlines specific quality criteria for new systems and related maintenance and operations requirements built to ensure that as new development occurs it will not be at the expense of the County, but covered by the new development.

14. Become more cost effective by expanding users through options to share utility services with Cities and/or transfer of services. If not viable, reconsider future of providing service. Acknowledge that a small amount of customers and large distribution size precludes long term cost and service comparison to small geographical cities especially in the County.

The County provides service throughout the 1,207 square mile area for both water and sewer services for a relatively small number of users (27,403 customers) which makes it most difficult to perform work cost effectively because of the economies of scale.

The capacity to service additional users may exist within both water and sewer systems. The County should try to share or provide contract support services with Cities. If this option is not viable, the County should review options to transfer services to others. Currently, the small number of users and large geographic area make it difficult for the County to be efficient.

This reality of a small base of customers and large geographical area necessitates that the County should acknowledge that cost comparisons between the County and denser City

costs are not equitable. The County should also acknowledge that it will be difficult to obtain efficiencies that are available to smaller agencies geographically with a large customer base due to the increased infrastructure and resource needs.

Planning

15. Establish an accurate count of meters and bill for the number of meters owned by County.

Multiple amounts of meters exist in the County records (difference of ~2,000) with values from those in Public Works maintenance and those in accounting varying. The County is now in the process of determining the actual number of meters for which the County is responsible.

This situation is further compounded by the fact that meter inventories are in both the billing system and another system used by the Utilities operations.

Establishment of the correct number of meters will ensure that the County is appropriately billing revenue as it appears that more meters may exist than are now being billed. The amount of potential billings could generate $100,000 in revenue.

16. Water and sewer lines should be inventoried with components and attributes, including spatial data collected then stored in the GIS.

The County water and sewer line inventories appear lower than expected based on the amount of users in LAC's benchmark data. The County has 485 users to each waterline mile and 613 users to each sewer line mile. LAC benchmark data shows an average (for 6 agencies) of 135 users to each water line mile and 216 users to each sewer line mile. The water and sewer line mileage is comparatively low for the County. The County has begun to transfer CAD files to GIS in an effort to update and affirm inventories.

This should be completed and all water and sewer lines accounted for and entered into GIS. This will provide the County with an accurate inventory that can be used to develop a work program and budget and estimate resources needed to maintain the lines as well as establishment of routine maintenance to ensure service is being provided.

17. Confirm cause of negative water loss being reported for some water operations.

The County should determine the cause of negative water loss which indicates either a reporting problem or some major infiltration as water used is reported to be more than is produced. In addition, water loss is an indicator of efficiency; the lower the water loss the better the efficiency and effectiveness of the operation. The negative loss for some locations is masking the County's overall reporting that is done to the State showing a relative low overall water loss percentage.

Negative water loss indicates more water is being sold than produced or purchased by the County. This is mainly occurring at the southwest regional plant which produces much of the County's water. This negative water loss should be identified to ensure infiltration and other items are not occurring that could negatively impact water quality or record keeping and/or reporting error exist in the system.

18. County should standardize and replace existing traffic signal controllers with those meeting current industry standards through a transition process.

The County has a good operational practice of utilizing only one controller type, yet the type of controller used is both outdated (NEMA) and no longer supported by any manufacturer. The parts for the outdated controller can be difficult to obtain. The County has relied heavily on utilizing spare parts from their existing supplies and cannibalizing used and old controllers from other agencies who have upgraded to later technology, to keep their system operational.

Further, it will become increasingly difficult to find new staff with expertise in monitoring and maintaining the current controller type. The County should replace existing outdated NEMA traffic controllers with those that meet current industry standards – National Transportation Communications for ITS Protocol (NTCIP). Some of the standards in new technology that FDOT and FHWA require will not readily match the County's outdated controllers.

This should be done through a transition process to allow the County to minimize this costly impact.

19. Traffic Engineering should establish formal contracts and work process with all agencies including specific scope and reimbursement schedule. This contractual revenue should be included in the Traffic budget and establish a credit process to budget for these receipts.

Traffic Engineering is currently performing work for many cities on verbal agreements. The County bills for this work yet there is no formal contract and allocation of resources to meet this effort. While there may not be any current operations issues, there is potential for issues in the future. Further, lack of contracts does create a lack of ability to project revenues and allow resources to be properly allocated and revenues properly accounted.

Further, as city and county officials in charge of traffic change, there is no documented expectation or role of what the County has the responsibility to maintain.

The County should establish explicit contracts to ensure the County maintains good business practices with City clients. In addition, by having a contract, the County will be able to include the contract requirements and resources in the annual work plan. The

Traffic Division should be credited in the budget for the expected and actual revenues from Cities with these contracts.

20. Establish and collect inventory of regulatory signs and link spatially.

Traffic signs lack an inventory. The existence and installation of these assets should be documented to allow County staff to establish routine maintenance to ensure that proper operation and routine replacement. Further the impact of potential storms, as caused by hurricanes and/or tornados, requires the need to document the existence of these signs. This will allow for the signs to be replaced after storm loss and/or damage. A methodology, such as systematically video logging, can meet this need yet still an inventory of key regulatory and warning signs is still warranted.

Currently, the County does not have an inventory of regulatory signs although the County is in the process of collecting some of this data. The inventory of this sign type should be stored or linked to a spatial database to allow the information to be viewed graphically. This will allow the County to monitor maintenance on the signs effectively and develop a work plan and resources needed based upon the actual inventory.

21. Routine maintenance should be established for all groups and documented in similar manner to signs including hydrant flushing, valve turning, and sewer line cleaning and inspection.

Routine cyclical maintenance is currently being performed on several activities among Public Works such as by the sign maintenance crew. Routines allow the crew to more effectively and efficiently schedule their work. Assignments are already established prior to the start of the day, and by grouping work travel time can be minimized. Further, using a systematic approach to work, such as routines, ensures that preventative maintenance (PM) is performed on all assets to maximize the life of the asset.

This same concept can be beneficial for other assets in addition to the signs example. Specifically, the Utilities Division performs several activities that would be optimal for the establishment of PM routines including hydrant flushing, valve turning, and sewer line cleaning and inspection. Other activities in other groups can benefit from routines, such as ditch cleaning, vegetation spraying, tree trimming, and enhancement of mowing routes, striping, and culvert cleaning. The County should establish routines for all groups on the appropriate activities and cycles that can be identified and stored in the CMMS.

22. Consider purchasing all signs prefabricated and eliminate most of sign manufacture operation.

The County should perform an evaluation of the need to directly purchase sign sheeting and sign blanks separately, as the County's current contracts for completed signs is less cost for all signs that are purchased than the cost of the components alone. Economically it does not appear warranted to purchase separate components then manufacture a sign when prefabricated signs can be purchased cheaper by $10-20 a sign ready to apply.

Other agencies in the state have also found that the cost to purchase signs prefabricated is less than the cost to purchase the various components and fabricate the signs.

The County should determine if some other non-economic factor warrants such a costly effort. All costs of making the signs including labor, equipment, materials, and overhead should be taken into account when performing the analysis.

The most cost effective process should be determined and provided for the County. This will allow for better costing of making signs and assist in future analysis. There may be some need for limited sign making abilities by the County for specialty signs yet an analysis should be done to warrant this to be done internally.

23. Perform traffic marking work in the most cost effective manner with both internal and contract support. Perform thermo plastic marking in the intersections with "in-house" staff and outsource the routine long line paint work.

The County is currently performing long line paint work in-house and contracting the thermo plastic line work that is done in intersections. The County should continue to utilize contracts where they are the most cost effective yet maintain some service levels.

It appears that it is most effective to utilize contractors to do the long line striping for the short term large work volumes. The cost analysis showed that contractor's cost for paint (less than $0.10 per ft) is lower than the County's cost which is greater than $0.12 per ft. Further, adjacent Counties have been able to get this service for considerably less than $.10 per foot. The equipment used for long line is also expensive to maintain and the current low use can not justify owning this equipment.

The intersection markings are smaller efforts that are spread throughout the County and require a more immediate response making it difficult to package for contracts. This effort should be monitored and a complete cost analysis done after a year's operation.

Long line marking performed by contractors could reduce the outsource cost the County is occurring for thermoplastic as the long line paint work can be packaged and does not require the immediate response or setup time as the thermo plastic marking.

24. Separate access and functions of small vehicles from large commercial vehicles at the landfill to allow mainly professional haulers on hill. Establish a separate citizen's area.

Currently the County has one access area at the Landfill for commercial and small residential vehicles. All of the benchmark agencies utilize a separation of commercial and residential vehicles which results in a safer and more effective practice. The County should provide separate access points to the landfill and transfer stations for large commercial vehicles and smaller citizen's vehicles.

Both user vehicle types utilizing the same access point creates safety issues for the smaller vehicles and efficiency issues for the larger vehicles. The smaller vehicles are more likely to be less familiar with the landfill, procedures, and the route to the dump site. While the commercial vehicle drivers frequently visit the dump site and are familiar with the route and procedures to stage and load. Separate site access will allow the commercial vehicles to efficiently deliver load to landfill.

25. Evaluate use of "haul and drop" capability. Haul garbage trailer to be unloaded at landfill allowing each tractor truck to make more trips and reduce overall cost.

The County currently has the haul tractor trucks loaded at the transfer station and driven to the landfill. These haul units drive to the top of the hill and then deliver their load. This requirement of driving to the top has multiple impacts including needing a larger truck tractor to drive to the top, more time at the landfill, and fewer trips per haul truck are made between the transfer station and the landfill. The County averages only 3-4 trips for each driver while the benchmark agencies have experienced 5-6 trips per driver in urban areas with a longer drive time and distance.

The County should use a combination of "yard mules" and haul trucks. The trucks would be loaded at the transfer station and would drop their full trailer at the landfill in a desired area and pickup an empty trailer prior to returning to the transfer station. A "yard mule" truck would then pick up the trailer and deliver it to the top. The haul trucks could then be lighter tractors (~ 4,000 lbs) and cost less, because they would not have to deal with any grades, thus enabling them to carry more waste. The haul units should be able to make 6-8 trips a day.

The process would require five less tractor trucks, two less operators, the current number of trailers (14), and two new "yard mules." All current tractor truck and garbage trailer equipment could be replaced with new lighter-weight equipment that would cost approximately 10% less to maintain and operate. Based on known solid waste equipment cost and an estimated weight-ratio analysis, the initial one-time savings could be as much as $430,000 with an annual reduction in maintenance and operations of $230,000.

26. The County should evaluate the economic benefit versus the cost of the continuation of the transfer station operations. Several options should be considered with two requiring evaluation. First the County can close the transfer station; or alternatively the cost for the transfer station should be allocated directly to the customer; or consider having commercial customers haul directly to the landfill and only allow residential use.

The preliminary evaluation indicates a lack of economic justification for the current transfer station operation. The landfill is approximately a 25 minute drive from the transfer station during non-commute hours with an average 90 minute cycle time. Various alternatives for further evaluation are outlined for two potential scenarios.

First scenario - An initial analysis of determining the trade off between having a transfer station and requiring commercial vehicles to haul directly to the landfill, as outlined in Finding 10 on page 3-5 the optimal location of a transfer station would be over twice the current distance.

The transfer station may be warranted to meet residential customer needs while having all other commercial haul units travel directly to the landfill. The overall operational costs would decrease if all commercial users were restricted to dumping at the landfill. The commercial customers using the transfer station would be impacted by a maximum 25 minute trip to the landfill to dump their loads. This however could be offset if the commercial customers were not using the station, the tipping fees for all could be reduced by the cost to operate and transport the loads.

While costs would be reduced by having commercial vehicles haul directly to the landfill there would still be cost to the County to operate the transfer station for residential. This additional cost per ton should be charged directly at the transfer station. For Fiscal 2005-06, 97% of the refuse tonnage at the transfer station was commercial (3% of refuse tonnage was residential). Utilizing that percentage and redirecting all commercial use from the transfer station to the landfill, the tipping fees cost at the transfer station should be $11 per ton greater than the tipping cost at the landfill. This is a substantial difference and a potential option could be to raise the transfer station fees $2-5 for resident usage and direct the entire commercial to the landfill thus reduce overall tipping fees.

Second Scenario -For the option of retaining the transfer station with commercial use, the additional cost should be charged to those customers. The additional cost to collect and transfer the commercial waste from the transfer station to the landfill is over $15/ton. This should be charged directly to the commercial user at the transfer station as they are causing the County to incur this additional cost. The cost should be computed and determine the allocation needed for all users at the transfer station.

Third Scenario - The complete cost per ton is defined as the amount of total dollars to place 1 ton of waste into the ground. The complete cost includes operations, personnel, capital outlay, capital improvement, debt services, grants and aids, transfers, reserves, closure, long term care, education, administration, new development, etc.; it is every cost under the division of Solid Waste. The total tonnage processed includes the waste of the landfill, transfer station, recycling, oil, anti-freeze, and so forth. This total cost per ton was calculated over 3 years as seen in Figure 4-1. The bold line represents a weighted average of tipping fees for Yard C, Class I, and Class III waste of $32/ton. The cost at the transfer station exceeds the revenue received from Waste delivered there. The cost could then be directly allocated to the users of the transfer station and rates adjusted accordingly.

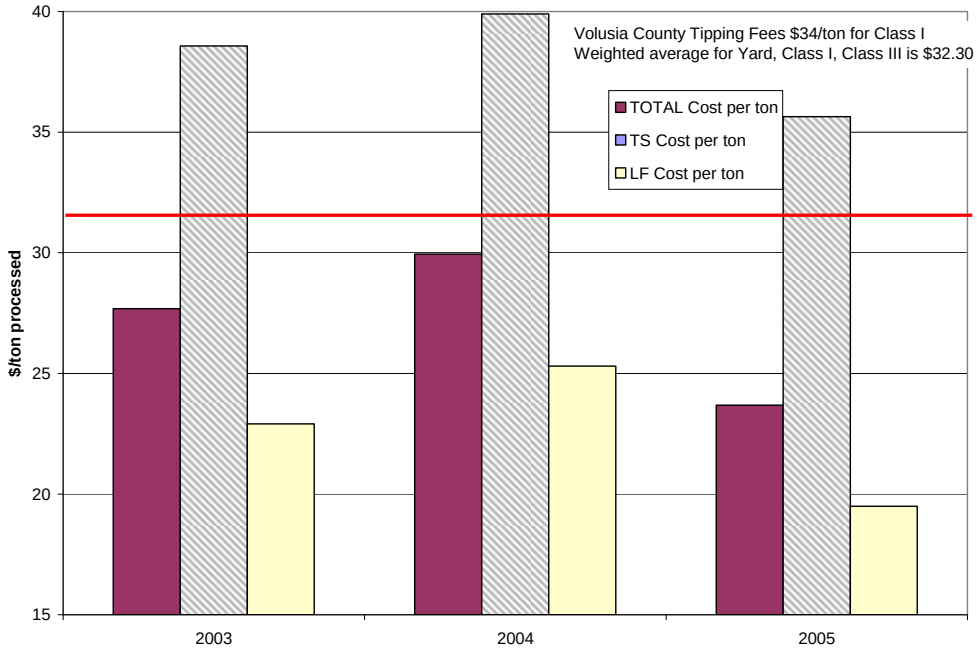

Figure 4-1 - Cost per Ton for the Total Solid Waste Division, the Transfer Station, and the Landfill

The County should evaluate these and other options to ensure that the transfer station operation is warranted and the cost of collection is properly allocated and revenue collected to correspond to the cost. The transfer property may have a better use for the County at this time and transfer labor and equipment resources being used may be allocated in a more effective manner.

27. Consider closing the transfer station on Saturdays and close the Landfill on Sundays.

Independent of other transfer station related recommendations, the County should also evaluate the days in which the transfer station is open to the public. Saturdays appear to have limited use and may not be cost effective to have the transfer station open 6 days per week. LAC reviewed the total tonnage processed by day of the week for calendar year 2006. Only 4% of the tonnage that was received at the landfill was on Saturday. This information is outlined in the findings on page 3-6.

The County could reduce the cost of the transfer station if it is not open on Saturdays. Staffing needed to operate the transfer station, hauling equipment and operational costs would be eliminated for one day of the week. Further it may assist with future staffing scheduling as coverage at the transfer station would only be needed 5 days per week instead of 6.

The County landfill is open on Sundays, a day that has the least amount of use. The main users on this day are small residential customers. Residential customer needs may be met by having the landfill open on Saturdays. Most other benchmark agencies do not open on Sunday and those that do indicate they also operate at a financial loss. The benchmark

agencies indicated those which did keep landfills open on Sundays did it for non-economic reasons.

Further, a traffic generation development "mega church" site is being built near the landfill entrance. There will be a potential conflict in traffic on Sundays for people attending these church services and those using the land fill. Closing the landfill on Sundays will minimize any conflict in traffic created by the church as well as being the most economically prudent approach.

28. Restrict commercial activity at Landfill to two hours in advance of closing.

The operation at the Landfill often has to extend the time of operations as a result of late day arrival of haulers. This often results in the daily closure and covering of landfill to be extended and staff working overtime to accommodate this. In fact this is anticipated and staff is often assigned with direct overtime scheduled.

This could be minimized by restricting contractor haulers to earlier times of delivery than small residential users. The residential user would use the proposed customer service area in prior recommendations and thus reduce need for overtime. This concept has been used by several benchmark agencies to minimize overtime.

29. Establish the capability of developing a performance budget and plan in the CMMS. Base the plan on the level of service, inventory, productivity, and link to a quality standard by activity. Use established performance budget as a tool to develop a budget for each department based on actual maintenance needs.

The current County budget process of determining resource needs based upon estimated needs and historical expenditures should be enhanced. This modification should allow each division to produce a performance plan and budget that is based on an annual work program and for the work performance that is anticipated. A performance plan and budget allows planned dollars to be directly linked to the quantity and quality of work budgeted.

This work program should be established by activity and include inventory, level of service, productivity, and required resources. Also, each outcome (road miles graded) should be linked to a quality standard. For example, develop a descriptive standard on the quality of the grading after completing the dirt road grading activity. This method establishes a budget based upon actual maintenance requirements.

The performance budget would not only establish accountability for maintenance, but it is a good business practice that ensures that work is planned based on a desired measured outcome. This should be a standard capability of the CMMS.

30. The consideration for establishing a main Public Works yard at the landfill site should be based upon resource deployment and workload optimization utilizing service levels and travel time minimization. The County should compare

estimates of workload utilizing the CMMS with specific yard locations and allocate staff appropriately.

There is currently a plan to reallocate Public Works yards and related resources to a new site at the landfill. While the landfill may have the space to accommodate the additional employees and equipment, it may not be optimal for the County to move all employees to this site from an efficiency standpoint.

In many cases, travel time from the Landfill to the job site will have a dramatic increase over current travel thus increasing the non-productive time and given the same workload have more labor needs. A tradeoff of saving on land and office operational costs versus the costs of productivity loss and increased response time should be weighted.

The County should use the projected workloads in various geographical locations from the performance plan developed in the CMMS and determine where optimally to locate and stage labor and equipment resources to minimize travel time.

31. Bridge Inspection Reports should be used by Road and Bridge for work identification and scheduling.

As mandated federal requirement all vehicle bridges over 20 feet in length are inspected by the state transportation department (FDOT). Each inspection report identifies rehabilitation and maintenance that should be performed on the bridge. This information can be useful for determining and prioritizing work that needs to be performed on bridges.

Currently, information from this inspection report is stored in engineering and is not being used by Road and Bridge to organize, schedule and perform maintenance. In fact only 21% of items identified, through interpretation of the reports, were completed in the review of work identified from one inspection to the next two years later.

By utilizing the bridge inspection reports and training maintenance staff to read them to identify work, the County can prioritize repairs and allow for better scheduling of work on the bridge rather than only performing reactive maintenance. Also, this will assure those items identified in the reports are being done.

32. Preventative maintenance program should be designed, planned, and used to schedule work for bridges and staff assigned.

The County lacks a preventive maintenance plan and process for proactive bridge maintenance. The only current preventative effort that is routinely done is the weekly inspection of the three movable bridges. Repair work performed on bridges is done weekly on Fridays.

Performing routine preventative maintenance on bridges that is planned on a specific cycle can reduce the reactive work that needs to be performed on the County bridges. Further, preventative maintenance can increase the life of an asset.

Bridges capital cost are high and extending the life of the bridge will reduce the long term cost of having to replace the bridge and reduce the potential for the asset being nonfunctional. Programs need to be established and set up in the CMMS for such basic tasks as lubrication of mechanical devices, scupper cleaning, joint replacement, bearing pad inspection, vegetation removal, etc.

33. Utilize latest technology for locating utility lines underground.

Locating water and sewer lines is the largest task of operation staff in water distribution and sewer collections and can often include performing costly investigation to ensure the proper location of where the lines are located.

Technology (ground penetrating radar) is currently available that can locate water and sewer lines without disturbing the ground. The County should investigate potential technologies to minimize removal or digging as this effort is most costly and may sometimes need to occur on newly paved or patched roads.

34. Utilize employee teams in all groups to clearly define activities and work measurement.

The County should develop a list of specific, well-defined activities for maintenance operations that is understood and communicated to all employees and used in the new CMMS. The County can then focus on the "critical" activities identified using the concept of Pareto's Law on the data recorded. This will allow the County to effectively and efficiently manage approximately 80% of the work effort by focusing on a limited amount of activities, which can be used to improve operations and increase the accuracy of work tracking for the County.

Establish employee teams with supervisors, which should be used in a team approach with facilitation support to identify the initial key activities and associated work units. Historical data from the current system should be utilized to accomplish this effort. This concept would be applied by County employee teams working independently in the future years on an annual basis to further configure, refine and update the system.

One example of a potential reporting issue was in Traffic Engineering where the two main activities that were reported account for 80% of the labor hours tracked to Traffic Signals which are installation and equipment maintenance, yet a significant amount of work was observed being spent on preventative maintenance. The data collected appears to be different from the observed work. The County should confirm the accuracy of reporting to determine if the two major activities identified are in fact the two largest activities or if the labeling of activities and lack of defined work methods may have resulted in a reporting error. Further, to eliminate future questions regarding validity of

the data, the routines and preventative maintenance program for Traffic Signals should be clearly defined.

35. Establish work methods with employee teams for crew size, method, and anticipated accomplishment with facilitation for benchmarks.

The Divisions currently communicate the general work guidelines (or work methods) verbally for the maintenance activities performed. These communications assist maintenance staff as well as management to understand the tasks that are to be performed and to provide guidance and expectations. Currently, general work and resources required may vary depending on the yard performing the work. Based upon TIS data provided by the County it appears that the 2 southern road barns utilize a crew size of 2 employees for asphalt work while the Northwest yard utilizes 3 employees on average. Having established guidelines would establish crew sizes and equipment to be used based upon an activity and establishes consistent quality and service level between all yards.

Documented performance guidelines should be developed for each activity with input from a team of County employees. The guidelines for each activity should include:

- activity definition,
- criteria to use for work identification,
- mix of resources required,
- method to conduct work,
- expected daily productivity, and
- work quality expectation.

This information would serve as a baseline and resource for all of the work planning, as well as providing the additional benefit of common terminology, a device for training, and most importantly, a tool for continuous improvement. The establishment of an annual update process of new methods, technology and processes will be considered as part of the guideline improvement process for each year. The guidelines would also serve as a basis for comparison and benchmarking to determine how various decisions are impacting efficiency and allow for staff input in the work process.

The guidelines should be made available to all maintenance staff and annually describe how they will be used and the intent of their use in work planning.

36. Establish activity based system that meets the needs of Solid Waste and integrates with future CMMS.

Currently the work tracking systems utilized by the Solid Waste division is mainly for assurances that specific quality items are being accomplished to ensure compliance and effectiveness. The ability to evaluate for cost and efficiency by activity has not been established.

Activities and work methods should be established for Solid Waste utilizing Pareto's law as identified in the prior two recommendations. This will allow the County to effectively and efficiently measure work being performed within the Solid Waste division. Once activities and work methods have been established, they should be integrated into the CMMS to allow for activity based work tracking and allow for future analysis of workload.

37. Utilize other alternate cover materials for Solid Waste at the Landfill in addition to mulch to maximize each cell capacity.

Currently the County's Solid Waste department utilizes dirt and mulch combination as ground cover daily. The County has recently purchased a tarp as an alternate cover to dirt and mulch but it is currently not being utilized. In comparison to other benchmark agencies there appears to be an opportunity for storage of more solid waste material per airspace cubic yard as was found in three of the four benchmark agencies.

The County should utilize the tarp which will minimize the need to haul dirt and consider other applied alterative materials and coverage. This could increase the solid waste material storage in each cell by minimizing the cover. Though the County appears to have a large capacity, the employment of alterative cover may allow a more efficient use of each cell and decrease the amount of cost per yard of material placed in the landfill.

38. Purchase equipment technology for compactors to optimize cover and monitor compaction and grade.

Technology is now available for usage of compaction equipment for landfills. Two of the landfills are in the processes of using this technology. The design of digital terrain models with GPS in cabs of compactors and bulldozers and other technology is anticipated to improve overall operations for the efficiency and effectiveness of a landfill which includes compaction rate and cover depth.

Cover should be minimized yet still meet the mandated placement and depth for permit and statutory requirements. Currently, placement of cover is being estimated manually by operators. There is technology available that can assist in performing these functions. Further, the technology can monitor both compaction and grade to a greater level of accuracy than currently available to the County.

Since Solid Waste permit requirements and regulations are so stringent this will be most beneficial to the County by minimizing cover used while still meeting regulatory requirements.

The County should investigate use of this technology in the immediate future to make more effective use of resources in landfill cover operations. This may require additional costs for obtaining the technology, considerable training of operators, and changing the future skill set of operators recruited and hired.

39. Utilize only established rates for billing and contracts and eliminate ability for managers (i.e. MC) to determine own rates. Mosquito Control should bill using the standard overhead rates.

The Public Works fiscal manager utilizes an established process for calculating overhead rates for in-house and contract rates. These rates are utilized so the County can recover the cost of doing business. If incorrect rates are used, the County may not recover the full cost of doing business and will be subsidizing other agencies for the work that it performs.

Currently, not all of the divisions are utilizing rates that have been established by Public Works' fiscal manager. Some rates are being created by division managers. These rates have not been calculated based upon proven industry standards and do not recover the full cost of the County doing business. The County should discontinue this practice and only utilize rates calculated by the Department's fiscal manager.

Further, not all divisions are familiar with the concept of overhead and how to apply it to billing. Overhead should be calculated by multiplying the base hourly rate by the overhead rate, and then adding this result to the base hourly rate. Therefore to apply overhead of 100% to the base hourly rate the actual multiplier would be 200%. LAC observed in contracts that overhead was being applied erroneously - the overhead is charged without adding it back to the original labor hourly rate. This is costing the County between $300,000- $500,000 annually in billable work to other agencies and should be ceased and contracts modified to ensure future funding is not lost and that the County does not subsidize work performed for others with little benefit.

40. Determine standard overhead rates for all operations. Reduce the number of overhead rates (22) to a more manageable range of 8-10 and into three categories by department with consideration for additional rates for both MC and Solid Waste.

The County should establish standard overhead rates for all of Public Works including an avoidable rate for work performed within public works, avoidable overhead rate for work performed within the County, and a full overhead rate for Contract rates. An avoidable rate can be utilized for internal cost comparison and outsourcing determination. The rate should be based upon "avoidable cost" and applied to activities conducted by the County for its internal evaluation. Applying this rate allows analysis, benchmarking, and other comparative studies in relation to maintenance costs and outsourcing evaluation. These overhead rates should be reviewed and updated on an annual basis in the CMMS.

A full overhead rate should also be determined to represent a "full allocation" of costs. This rate takes into account the costs related to all aspects of the District's operation and includes a partial allocation of various fees, administrative salaries, insurance, professional services, and rents/leases as examples. This rate should be applied to work conducted for others and is designed to recoup the full cost.

The County is already calculating avoidable and full overhead rates for each division of Public Works. This method is most accurate in allocating overhead costs and billing reimbursements to division but can be confusing for the divisions to utilize. Further, it will be difficult to find one CMMS system that will be able to accommodate the current number of overhead rates (22) and still meet the other needs required of the software.

It is advisable to reduce the number of overhead rates to a more manageable number of 8 to 10. This will allow for the system to be automated and still allow all of the overhead costs needed for the department to be recovered for billing and for accurate cost comparisons to other agencies.

41. Develop pre-established full allowable FEMA rates.

The County should also develop additional rates for FEMA that allow for all costs. Currently the County has established FEMA rates but it appears they can be established at a higher rate. The FEMA rate should be based on two fringe benefit rates; one for regular time and another for overtime, and apply them to the hourly labor cost for all FEMA related work.

The fringe benefit rate for regular time includes holiday pay, vacation, sick leave, social security, Medicare, unemployment, workers compensation, retirement, health insurance, and life insurance as a percentage of regular pay. The fringe benefit rate for overtime includes social security, Medicare, unemployment and workers compensation as a percentage of regular pay. FEMA's fringe benefit rate sheet should be used as a guideline for rate development.

These rates need to be determined annually and have the capability to be modified to comply with federal requirements while permitting the full amount allowed by statutes

42. Confirm inventory material control cost for utilities and if accurate, establish a more cost effective control system based on 20-80% Pareto's law.

Material inventory control overhead is generally between 10% and 20% or for every dollar of material owned, it costs $0.10 to $0.20 to maintain and store material. Currently, all Public Works divisions, with the exception of Utilities, are under 15% overhead. LAC did not observe a significant amount of material control being performed by Utilities to account for a material overhead rate greater than 30% indicating potential inefficiency of storing and handling material.

The calculation for material overhead should be reviewed to ensure that overhead is accurately being accounted. For example, a percentage of the building costs may be added as material overhead if the site is being used to store materials. Utilities have many sites including package plants and regional plants that may hold some material but their main function is not an actual material warehouse. The percentage of the building

use as an overhead may be able to be adjusted as the site itself would remain regardless of whether material is held on-site.

If it is determined that the material overhead rate for Utilities is accurate, efforts should be made to reduce and/or eliminate unnecessary material support or elimination of inventory. A system should be established to monitor the inventory utilizing Pareto's law, the 20% of material in stock that accounts for 80% of the total material cost and focus on monitoring these items only. This should provide a tool to help decrease the material overhead for Utilities.

43. Stormwater assets should be defined and staff educated on ownership.

The ownership of stormwater assets needs clarification. Ordinance 92-89 states that stormwater assets are "components which provide for collection and disposal of stormwater." Currently, there is some confusion as to which assets are maintained by the stormwater group and stormwater funding, and stormwater assets that are maintained by the Road and Bridge Division.

As a result, there is a potential for funding to not be properly allocated and similar assets maintained at different service levels. To reduce confusion and ensure assets are properly and consistently maintained, stormwater assets should be clearly defined along with ownership responsibility, and staff educated on that ownership. The ordinance may also need to be clarified or at a minimum a policy outlining what assets comprise the stormwater system.

44. Implement one simplified project management system for all groups throughout Construction Engineering and link to GIS. The system should focus on cost and schedule and be utilized for CIP. Fully automate and systematize work assignment and coordination.

The Construction Engineering Division is functionally organized with several groups within Construction Engineering with each having their own unique format for compiling data and monitoring projects making project management information difficult to compile. Further, the determination of the status of a project is lacking as project data stored differently in different applications on by several of the groups within Construction Engineering.

Further, to meet the needs of all of the groups within Construction Engineering including the rights of way group, the system will need to be able to link to GIS. The system should focus on being able to schedule work and projects for all groups of construction engineering and be able to provide project cost and status reports. With all of these components in place the system should be able to plan and develop cost estimates and be utilized for the capital improvement program.

The project management system should be a fully automated system with the ability to perform work assignment and coordination. Currently, there is no system in place to

automate. By automating work assignments, the Division will be more able to evenly allocate the work load and coordinate projects to ensure that there is sufficient resources and funding available to perform work.

45. PMS should be managed by Construction Management and used for candidate selection with other staff such as Road and Bridge and Project Management having input in final project selection. PMS should be linked with GIS and process established.

The County is currently in the process of collecting data and compiling a PMS using a combination of staff knowledge with the aide of an outside consultant. Once this information is available, the County should utilize the PMS information to identify candidate projects for the Capital Improvement Program. Since the capital improvement program is managed by Construction Management, and the PMS will be used to identify projects for the Capital Improvement Program, it would be most beneficial for the PMS to be managed by Construction Management as well.

The information in the PMS will be a valuable tool in prioritizing pavement needs and assessing which roads have the greatest need for rehabilitation and maintenance. Additional input and guidance will be needed from Road and Bridges and Project Management based upon their expertise and knowledge of the County's roads. This can be used to assist in final candidate selection to ensure high priority areas are completed in a timely manner.

Organizing

46. Assign Administrative group in Public Works to be responsible for overall new CMMS operations and monitoring along with the related performance plan update including overheads. Provide support and training for all users to become internal monitor of performance and analysis.

The CMMS will require both annual maintenance and annual update. The administrative group should be responsible these functions. This will ensure information is consistently updated among all divisions and the proper information is used to update the system including labor rate, equipment rates, and overhead rates.

Further, the administrative group should be responsible for assisting the divisions in developing a performance plan and updating the plans within the CMMS. This will create one central group that is experienced in plan development and can assist the division users.

Finally, the administrative group should become the internal monitor of the performance data and analysis. This will ensure data is being entered accurately and in a timely manner by all divisions. This will allow for a continuous improvement process to be established with quality control and accountability to be established. If the division users need help, the administrative group will be able to respond as the "power users"

minimizing need for outside consultant and/or vendor support. There will be some internal coordination with County IT department for hardware, database, security, and network issues

47. Water distribution requires additional support and the specific amount should be determined from a performance plan. Water production staffing appears to be adequate. Distribution preventative maintenance activities should be established and adequate staffing allocated.

The initial benchmark comparison based on needs both current and desired needs shows an inadequate amount of labor resources assigned to water distribution. A performance plan can be utilized to estimate specific resource needs. Based upon the activities being performed, the crew size of each activity, the inventories, and service level, the plan can determine how much labor, equipment, and material are needed to meet the needs of the County.

Water distribution appears in the benchmarking evaluation to need additional staffing while production staffing appears to be generally adequate. Once the performance plan is developed for utilities, it should be utilized to determine the specific resource needs for both production and distribution and allocate or hire staff as needed. The initial evaluation indicates that two employees may be warranted and these should be confirmed in utilizing the performance budget.

Preventative maintenance can increase the life of an asset and reduce the cost of future maintenance. It is especially important to perform preventative maintenance on water distribution lines as these underground assets are not visible. A preventative maintenance program of flushing and value turning and leak detection is needed.

Once a PM program is established, the performance plan should be utilized to determine staffing needed to meet the needs of the plan. Staff should be allocated accordingly to meet the plan.

48. Utility distribution staffing requirements should be correlated to installation of more residential backflow devices for reclaimed water. Consideration should be made for additional charges for service with funding mechanism established.

The County provided customers the ability to purchase reclaimed water. Reclaimed water requires the installation of a backflow device to ensure that reclaimed water does not contaminate the potable water within other areas within the resident's home. As a result there is additional work that must be performed by utilities including installation of the backflow device and the monitoring of the backflow device to ensure that it is properly inspected and functioning.

The additional resources required have a financial impact on the County. To ensure the County is properly reimbursed for its effort the County should consider an additional charge for providing installation of backflow devices and the future monitoring of the

devices. This will ensure that a proper funding mechanism is established for the backflow program.

49. Continue to use contract meter readers and evaluate outsourcing other more manual related support tasks such as meter installation after the CMMS is installed.

The County's contract cost per meter read was lower than the average cost of other agencies to perform meter reading in-house. The County should continue to use contract meter readers and monitor cost against others.

Further, the County should evaluate the opportunity to perform other non skilled support tasks by contract such as meter installation. This would allow more skilled staff to perform other task such as additional preventative maintenance.

50. Confirm need for the staff resources assigned for internal design production capability of over $3-4 million. Consider reallocation of resources to more cost effective functions.

Currently in the project management groups of construction engineering there are four project managers, nine employees for production and one engineering specialist. Nine employees for production are considerable with a capability of over $3-$4 million in design production.

This appears to exceed the existing internal needs of the project management group. The County should consider reallocation of these resources to more cost effective functions unless this group can annually produce projects with values of $3-4 million. This will allow the County to make the best use of its resources including labor.

51. Establish process for allocating projects evenly among project managers and utilize designer as small project manager.

Current project staffing for the Design and Project Management staff of the construction engineering division does not appear to be evenly distributed, with some project managers having significantly more projects to manage than others. Based upon information observed by LAC, one project manager was responsible for 31 projects while the remaining three project managers were responsible for 2, 6 or 10 projects.

The project management software should be used to determine project mangers that have sufficient availability to take on additional workload and distribute workload evenly among managers. Further, a designer should be utilized as a project manager for small projects. This will further reduce the inequality of workload from designers and project managers.

52. Consider transferring Stormwater to an independent separate operating group outside of Utilities.

Stormwater operation in many agencies is a separate operation as it often has unique functions with an independent funding source.

Stormwater currently utilizes a combination of Road and Bridge, mosquito control and contract resources as staff. Stormwater appears to warrant being established as a separate group outside of Utilities and the other divisions based upon the size of the budget ($3-4 million) which is larger than other groups such as traffic, and it is independent of operation (its uses no utility operational support) and the time and effort spent on billing and coordination.

This will eliminate the need for initial billing, establish accountability, and consolidate all of Stormwater operations under one group.

Further, this will eliminate the unusual practice where stormwater equipment that is owned by stormwater is being billed back to stormwater by other Divisions that operate those vehicles. This is acceptable if the replacement is funded by others but is a confusing practice. The new stormwater group may need to compensate other divisions for additional resources such as gradalls and ditch cleaning equipment that those divisions have already paid.

53. Consider transferring ditch cleaning capabilities of Mosquito Control (MC) to stormwater as staffing is high for MC as a result of non-typical functions.

Current Mosquito Control staffing is higher than the average of other mosquito control agencies based on responsibilities. The data indicates .93 employees per every 10,000 residents based upon 46 mosquito control employees and a total County population of 493,000 (This is conservative as the actual district is only a portion of that amount). While the average of other mosquito controls agencies are .83 employees per 10,000 residents. The County appears to have a higher staff per resident ratio as the County appears to perform many functions that are not typical to Mosquito Control operations including vegetation control and ditch cleaning support.

The ditch cleaning group in Mosquito Control should to be transferred to the newly established Stormwater Utility group. The Mosquito Control group that performs ditch cleaning also has contracts with several outside agencies such as Florida DOT, St. John's Water Management District and Volusia County Schools. This work is not directly related to Mosquito Control and should continue to be performed through the new developed Stormwater group. An orderly transfer of these contracts would have to occur. This reassignment will ensure accountability as the function of the division is directly related to the work being performed by the division.

54. Mosquito Control should identify and only work in those ditch facilities in which it has authorization to perform maintenance or paid to perform those tasks.

The County is currently performing work in ditches where no contract exists based upon direction of Stormwater and/or Mosquito Control management. The County should identify exactly which ditches it has authorization to work in and only work in those ditches.

Working in ditches outside of the County's boundaries without funding is inappropriate. Further, the work is not reimbursable and is utilizing other County funding sources for non-county work. This type of allocation of resources to non-County work should cease without some assignment by the Board and/or County manager.

55. Traffic should focus on traffic signal operations and traffic studies with managers selected based on skills needed for maintenance, operations, and design functions.

The Traffic Engineering division should focus on traffic signal operations and traffic studies, which are the expertise of the County traffic engineers or obtain staff with more operational background.

Further, future management employees should be selected based upon skills needed for understanding maintenance, operations and design functions. Current senior traffic management and staffing experience is with Traffic planning and engineering. Additional maintenance and operations experience at this manager's level would complement the department's current skill sets.

56. Traffic sign and signal staff should be allocated throughout the County with resource allotment to the west side where the larger amount of County assets exists. Consider utilizing other staff, such as mowing, for sign support during the winter off season.

County signal, sign and traffic markings assets are spread throughout the County yet crews are from Holly Hill. To minimize travel time, traffic sign crews should be stationed and positioned closer to the work.

Establishment of locations in both the east and west parts of the County should be determined based upon where the majority of signal, sign and markings assets are located. Currently the traffic crews stage out of the Holly Hill barn, yet many assets are located in the southwestern portion of the County in the Deland area which is where the County is experiencing much of its growth. By having some crews in the west and the east, travel time will be minimized and productive time increased.

The sign staffing is lower than benchmark averages and should be evaluated based upon the performance plan. There appears to be an opportunity to supplement these sign employees by utilizing other County staff during the off-season or winter months to assist with some low skill sign maintenance work. Staff that performs mowing or other seasonal tasks have more time available in the winter due to lower workload during that low growth period. This would be a good use of utilizing existing resources to perform non

technical sign support of sign cleaning, vegetation, site obstruction removal and work identification.

57. Future Traffic staffing levels should be based upon County's assets and those of agencies under contract.

In addition to having many assets in both the east and west side of the County, the Traffic Division performs contract work for cities and other agencies. Not all of these agencies have formal contracts with the County with most work done as a result of verbal and historical understandings.

The County should establish formal contracts with these agencies, use this revenue stream from contracts to base the allocation of work based upon all work to be performed. Also, monies collected by Traffic should be allocated to the budget used in performing the work.

58. Consider use of staggered schedules at Solid Waste to eliminate scheduling of standing overtime, to minimize overall use of overtime and meet needs outlined in the Performance plan.

The workload at Solid Waste varies by time of day at the landfill yet most operational staff start at a similar time. The result is that considerable overtime is required and is scheduled as peak workload can be estimated. Other agencies to meet this issue at Solid waste facilities vary the work schedules with staff reporting at various times to minimize overtime yet have staff available at peak workload times in the day.

Opportunities to minimize overtime appear to exist by properly scheduling staff. This can be done by staggering staff schedules to ensure all hours of operation, including weekends and evenings, are appropriately scheduled and overtime is minimized.

If overtime is necessary to meet work demands it should be used in emergency and in a non-scheduled manner as it was intended. If overtime continues to be used once staff schedules have been appropriately staggered, then the County should utilize a performance based plan to estimate actual full time resource needs.

59. A dedicated bridge crew should be assigned for bridge PM for both fixed and movable bridges. Routines need to be developed for both functions.

Current preventative maintenance tasks for movable and fixed bridges are minimal. Repairs are generally performed on an as needed basis. There is currently no staff dedicated to performing preventative maintenance on bridges.

Routines need to be developed for both fixed and movable bridges. These routines can be created utilizing the information in bridge inspection reports discussed in Recommendation 31.

This recommendation will increase the life of the assets due to better maintenance and ensure that there are not bridge failures. Once routines have been established and documented, a dedicated crew should be assigned to completing the routines to ensure work is done.

60. Administrative support in traffic should be assigned by function and report to various supervisors.

In the Traffic Engineering Division, the Administrative support group is a separate group with informal operational responsibilities that often conflict with operational groups. This group provides direction to supervisors on how work should be tracked and performed. This creates unnecessary conflict between supervisors experienced in the work and administrative staff.

This can be reduced by assigning administrative staff to report directly to the function they assist. For example, administrative staff should by assigned to traffic signal maintenance in Holly Hill and another administrative support person assigned to engineering at the Deland office and an administrative staff support person assigned directly to the Traffic Sign supervisor with all administrative support being assigned directly to the supervisor they are responsible for performing administrative support. This will ensure accountability and teamwork to accomplish an efficient and effective maintenance operation.

61. Transfer the sign and marking function in Traffic to the Road and Bridge and allocate staff to both east and west yards based on assets.

Direction for signs and markings, other than administrative, is mainly internal to that group. The work as mentioned for signs and markings is currently distributed throughout the County yet the crew is stationed out of the Holly Hill barn.

Further, the signs and marking group must often coordinate with the Road and Bridge division to coordinate with other tasks and striping. There is minimal support for signs and marking by traffic signals and current Traffic Leadership has traffic signals as the Department focus. The County should consider transferring the signs and markings group to Road and Bridges and stationing staff throughout the County. This would allow for more immediate response and ability to obtain support from Road and Bridge for peak needs.

Although the sign and markings group would be stationed at multiple yards, they should continue to report to one signs and marking supervisor. This will ensure continued coordination and scheduling of the groups work which currently occurs and appears to be efficient and effective. The staffing for signs and marking should not be made available to directly assist Road and Bridge for road work except during emergencies as Signs and Marking resources are limited and they need the assistance of Road and Bridge staff.

62. Continue the Utility practice of utilizing a cross-trained distribution and collections crew.

The County is performing the innovative best practice of utilizing one cross trained crew for both water distribution and wastewater collections work. This is an innovative idea that makes the best use of available resources. Further, the practice reduces the need for the number of employees on call out.

This practice should be continued and cross training applied to other groups where applicable for all of utilities. For the distribution of work throughout the County this is one practice that allows work to be effectively done.

63. Reduce span of control and establish two senior staff reporting to Mosquito Control Director.

The original organization at the beginning of the study had 15 employees reporting to the Director of Mosquito Control which exceeds good business practices for the level of management of the Director of Mosquito Control. An optimal practice is one of having 8 or less direct reports. This allows for optimal levels of control and management in an organization.

The County should consider dividing operations having two senior staff report to the Director of Mosquito Control with one manager in charge of managing operational components of Mosquito Control and the second manager responsible for support services for Mosquito Control. These positions and some administrative support appear to be adequate to meet Mosquito Control needs.

64. Allocate administrative staff equally throughout the Department matching organization structure. Shift Mosquito Control (1) and Traffic (1) to newly established Stormwater group and Road and Bridges to account for shift of both the ditch cleaning and the signs and markings crews.

There is an inequality of the distribution of administrative staff between the various divisions. The Road and Bridges group which has the greatest number of employees and must perform data entry into the TIS system for service requests and daily work performed has administrative staff equivalent to 4% of their total staff, while Traffic Engineering, Water Utilities and Solid Waste have much greater than 4% administrative staff.

The Water Utilities and Solid Waste staff may be warranted based upon the additional systems they must monitor including the Tokay Backflow system, state water quality requirements, Contracts with Waste Management and for Recycling.

Traffic Engineering staff appear to be performing duplicate and triplicate entry of work for monthly reports and billing. With the establishment of a new CMMS, much of this redundant work will be automated and will not require duplicate entry.

Further, in conjunction with Recommendation 61, the signs and marking staff should be transferred to Road and Bridge. As a result, the administrative staff that would have been performing their data entry and billing would not be required for Traffic Engineering but would still be needed by the sign group. Therefore, one administrative person from Traffic Engineering should be transferred to Road and Bridge and be responsible for performing work for the signs and marking group.

A similar situation will be occurring with the Mosquito Control Division. In Recommendation 53 LAC recommended the County transfer the ditch cleaning group to a separate Stormwater division. The Ditch cleaning group is a significant portion of the Mosquito Control Division. Therefore, once the transfer occurs, the Mosquito Control Division should incur less administrative work as less billing and data entry will need to occur. In addition, the County is consolidating the Mosquito Control Division from two yards to one yard at the New Smyrna Beach facility. This should reduce the need for administrative staff at each site. As a result, one administrative person should be transferred to the newly established Stormwater division to assist with the daily entry of work, monitoring service requests, and to assist with billing.

65. Develop succession planning program. Assign key management staff in the Drop program to alternate positions to develop and mentor replacement staff near the end of drop program.

Many key employees were approaching retirement and in fact have committed to a Drop program in which they will retire in five or less years. The Drop program creates a unique opportunity for the County to identify in advance which employees will be retiring and when they will be retiring. As a result, the County should develop a succession program for employees in key management positions in the Drop program.

As a part of the succession planning, the County should consider using the employees to "step up" into these positions, allowing them the opportunity to be mentored as replacement staff which will be taking over responsibilities of their position. This will allow for a smooth transition from the existing employee to the new employees and ensure the County can maintain its services with little impact to the customer and employees.

66. Evaluate the assignment of the location of Transportation Planners.

Traffic Engineering currently has two planners assigned. The County should consider the transfer of these planners to the County planning functions. Their work is independent of most other functions in Public Works and they have more relationship with the planning section and development that is outside of Public Works.

The benefit for their work tasks being in Public Works seems minimal and skill sets and work tasks of the employees appear more related to departments who review and perform high level planning.

67. Consider integration of Utility Engineers under Construction Engineering and at a minimum utilize the same project management system.

The Utility Engineers and Construction Engineering groups are performing similar types of functions but for different types of assets. The Utility Engineers focus on utility assets while Construction Engineering focuses on Road and Bridge assets yet both plan and deign construction projects using both inside and external resources.

The County should consider the integration of these two groups for economies of scale purposes and being able to optimize the high demand for engineers on staff.

The groups can assist each other in planning and monitoring the progress of work and assisting in the peak workloads of both groups. Further, many Utility assets can have a direct impact on the right of way and with both being in the same division could facilitate communication and planning between the two groups. Finally the sharing of resources provides backup and cross training for engineering functions.

Both groups should utilize the same project management system which will allow both groups to monitor the status of all projects that may impact each operations as well as. Even if the engineers are not placed in the same group they should still both use an automated project management system and use other technical tools such as CAD and GIS.

68. Mosquito Control should participate in fleet leasing program if it is economically justified.

All divisions of Public Works with the exception of Mosquito Control participate in the Fleet leasing program. Most of the equipment already in the Fleet leasing program appears to be replaced on a timely schedule and the Fleet Department utilizes life cycle costing to determine which vehicles are replaced.

Though Mosquito Control group has some specialized spray equipment that is difficult to lease, there appears to be an opportunity to lease equipment especially pickups and heavy equipment through the Fleet Program.

As a result, the Mosquito Control should evaluate all equipment to determine if it is economically justifiable to participate in the Fleet Leasing Program. Those assets where is does appear to be justifiable should be transitioned into the leasing program.

69. Establish an internal service fund. Fleet should manage and own all equipment and rent/lease back to divisions. Establish life cycle costing to allow for optimal replacement of fleet and link to a replacement fund.

Currently each division is responsible for purchasing the both necessary new and replacement equipment. The division must budget for equipment annually as a capital

purchase with the exception of equipment in the Fleet Leasing Program which is monitored and replaced by the Fleet Department. This leasing concept forces each agency to review the cost to keep and operate each piece of equipment and involves Fleet in this decision.

An opportunity exists to establish an internal service fund for fleet which each division contributes into annually for the replacement of equipment. Utilizing a formalized internal service fund could allow consistency and uniformity on the budget by allocating financial resources more evenly and optimally. The result is a more uniform yearly expenditure for the Fleet vehicle replacement program. To allow users to completely understand this process it should be outlined and documented and focus on the operations cost.

Further, the fund should reflect the actual useful life expectancy of vehicles for the County to ensure adequate funding to carry out the life cycle costing and replacement program.

The Fleet Manager has already performed some initial life costing of the Fleet for the Solid Waste and Road and Bridge division. Life Cycle costing should be performed on all vehicles to review the annual cost to maintain and operate equipment. As the annual cost of a vehicle due to maintenance expenditures exceeds the annual cost of a new vehicle, the County should consider replacing the vehicle.

Since this information is to be utilized for determining optimal replacement and life of a vehicle, it should be linked to the replacement fund to ensure adequate funding is available for replacement.

70. Fleet should bill based upon actual year expenditures incurred rather than prior year.

The Fleet Department should bill departments based upon actual year expenditures. The current system of billing each user division based upon the prior year billing results in departments having minimal incentive to reduce fleet as they would not achieve any savings that fiscal year as a result of the reduction of low use equipment. Further there may be no saving if costs within fleet are just reallocated.

Not only does current process encourage a larger fleet, it effectively separates the relationship between mechanics work and the actual expenditures. Further, Fleet can not accurately bill for new equipment that has been purchased by the user division after the year has started which also results in another incentive to expand the fleet size.

To ensure proper allocation of the cost to the appropriate user division or the Fleet Department, the charges should be based on actual expenditures for the current year.

71. All divisions should use CMMS to monitor equipment "out of yard" usage. Annually calculate fleet rates by class utilizing actual charges and update in the new CMMS.

The CMMS should be utilized to track "out of yard" usage which is based on the amount of hours that the vehicle or equipment leaves the yard and is staged and committed for a particular activity and is unavailable for other employees to use. This measurement would be in addition to the operating hours of the equipment or the running time of the hour meter or mile meter.

Further, equipment rate determination methods should be developed and documented for consistency using all costs such as repair, maintenance, fuel & lubrication and replacement. This is significant when computing the total cost of performing a particular activity (resource costs of labor, equipment, and material). The true cost of the operation would be under or over estimated by using a rate that is substantially lower or higher. Cost comparisons, as a management tool, can be used to determine if a particular operation is efficient or inefficient. However, incomplete cost data can result in an incorrect conclusion, i.e. true costs are not reflected in the equipment rates.

Fleet Maintenance should adopt the methods outlined in APWA's *Shop Rate Guide* (Crandell, Dale E.; American Public Works Association, 1998). Utilizing this method is useful in many ways:

- Communication with Customers- being able to break down the equipment rate allows users to understand what the rate includes.

- Comparison with others- having rate components available can facilitate "apples-to-apples" comparison with other agencies and service providers.

- Financial management- allows an agency to periodically track rental revenues by component and match these against actual expenditures.

The equipment rates calculated should utilize the "out of yard" hours tracked in the CMMS. Further the administrative group should update the CMMS annually with the calculated equipment rates and use them for tracking the cost of equipment to a job or activity.

72. Confirm low usage equipment for 100+ vehicles within Public Works. If warranted, consider disposing of unneeded or low use equipment. Annually monitor low use and high unit cost with fleet to determine if such vehicles are warranted.

The Public Works Department appears to have sufficient equipment to conduct the current work load. Many pieces of equipment are below NAFA averages in both usage and age. Although mileage and hourly usage is low, the vehicle may actually have high "out of yard" usage. This equipment is needed even though meters do not indicate high

use. However, some equipment appears to have significantly low usage and should be evaluated for its overall value to the maintenance operation. The evaluation should identify pieces of equipment with low use and high unit cost with Fleet.

It was identified that several low use vehicles exist and the equipment is indicated in appendix B. This equipment should be checked for validity of readings and for affirmation that a unique need cannot be met through leasing, borrowing, or contract. If valid, the County should consider trading or disposing of low use or non-essential equipment. Especially those with a high unit cost.

73. Train on the use and interpretation of data from Fleet and provide feedback data's accuracy. Assign key staff role as fleet coordinator for PW to ensure use of this information.

The Fleet Department uses the Faster system for tracking and monitoring maintenance performed on vehicles along with the cost to perform maintenance. This information is a valuable tool and can be utilized for performing life cycle costing, determining when equipment needs to be replaced, or reviewing usage of equipment to determine if it is needed. Public Works is not currently utilizing this information on a regular basis.

All divisions of Public Works that utilize vehicles should understand and utilize the Fleet data. Key employees from each division should be assigned the responsibility of coordinating with the Fleet Department to receive data. In addition, the Fleet Coordinator should work with their division to determine if information is accurate. If the information is not accurate or is incomplete, Fleet should be notified. This will allow for better coordination between the Fleet Department and the Public Works divisions.

74. Utilize appropriate equipment for sewer cleaning whether in-house or contract support.

The equipment currently utilized for sewer cleaning is not adequate. A small vacuum trailer apparatus is normally a response vehicle used in that role. Currently that equipment is being utilized for all cleaning of lines.

Once the County implements a routine sewer cleaning program, a large vehicle truck may be a more effective tool at removing debris and roots from sewer lines. In addition, the larger truck should allow for greater efficiency in line cleaning allowing more lines to be cleaned in similar or less time with the same amount of resources.

75. Develop a borrow site plan for the Landfill. Once travel is minimized, match haul units to the new borrow site plan.

Haul distances for cover dirt are increasing due to selection of locations of borrow sites further located from cells. A plan for current locations and future locations of borrow sites should be established to minimize travel time from the borrow pit(s) to open cells. The supply of cover dirt is plentiful and inexpensive, but some effectiveness and

efficiency is lost when the travel time to provide that cover dirt creates excessive haul travel time.

Once an optimal plan is determined the appropriate number of haul trucks can be allocated to move cover dirt from the borrow pits to the open cell(s).

76. Utilize performance budget to annually determine equipment resource needs. For example, Solid Waste should match number of haul trucks to the need.

A performance based budget can be utilized to estimate resource needs including equipment needs by activity or division. Resource needs are based upon the activity guidelines, inventory and service levels and will be beneficial to determine for all divisions. By first optimizing the plan and being more effective and efficient with work the County can then optimize the number of equipment needed. Optimizing the number of equipment pieces needed to the equipment owned will save the County in unneeded equipment expenses with potential one-time salvage cost of vehicles that are not needed.

For example, borrow sites where the County hauls dirt from up to the top of the cell each evening is being located further and further from the cells. This can cause an increase in travel time. As a result, this increases the need for the number of haul trucks. The County should first optimize their work plan by developing a borrow site plan that indicates where future borrow sites will be located. The location should be determined based upon minimizing travel distance to the active cell yet still allow for expansion. Once travel time is minimized through the borrow site plan, Solid Waste should optimize the haul units needed by utilizing a performance based plan from the new CMMS.

77. Consider use of SCADA for monitoring Solid Waste gas and leachate collection equipment.

Technology exists to allow for remote monitoring of flow, pumps, and valves that is more of a normal fro most utilities. Several benchmark agencies use technology such as SCADA to monitor and improve operations.

The County effort now is based on visual monitoring with some telemetry being applied to monitor but not control facilities. The distribution of utility assets and lengthy travel times provide need for more remote access and control.

The County should evaluate the use of this technology and plan to apply in the immediate future to allow for a cost effective way to evaluate the Landfill systems.

78. Establish better tracking for helicopter system. Utilize cost with avoidable overhead for charges to other groups within the County for their use.

Currently the County tracks all helicopter usage on manual logs which compared to the actual helicopter meters did not appear to match. Flight hours can impact the hourly cost per helicopter and should be able to be easily monitored and compiled. The County

should track and store flight time and helicopter usage in an automated system and annually calculate the hourly cost per flight hour.

In the helicopter logs, the County tracks administrative flights with some of the flights flown for other Departments or County entities. These departments should be charged the actual cost of the Mosquito Division to perform these flights.

The cost should include the hourly flight cost of the helicopter and any of the internal overhead costs calculated by Fiscal personnel of the administrative group.

79. Evaluate the need for two helicopters and compare in-house cost to contractors.

The initial comparison was done between other Florida Counties, contracts, and Volusia County on the aerial program using a cost per flight hour. Initial information indicates the cost is within range of other agencies and contractors.

Yet due to the high hourly cost of such a program, the County should evaluate the need for the two separate helicopters. The County should utilize a performance based budget to estimate resource needs as usage for all activities and assets including the helicopters. Based upon the aerial hours related to mosquito control inspection and spraying provided for one year and the actual hours tracked in the CMMS after one year, the County should be able to determine if two existing helicopters are warranted.

80. Establish a process for material control and perform in new CMMS.

Each division of Public Works tracks and stores data in a separate system for material control. This has resulted in different methods for tracking the usage of material and how the material is stored and when it is purchased.

The new CMMS system should be used to track and monitor usage of material for all divisions. One system will allow for a similar material control process to be utilized by all divisions of public works. Utilizing employee teams developed in recommendation one, the County should establish a material control process and clearly and concisely document the process. Necessary employees should be trained on how to utilize the CMMS to perform the process as outlined by the employee teams.

Directing/Controlling

81. Develop similar work order and tracking process for all divisions. Customer requests and work orders should be combined for as many systems as possible in the new CMMS with linkage made between Solid Waste WM systems. Replace TIS work order utilizing new CMMS and ensure field for tracking enforcement/illegal dumping issues. Link new CMMS to WM system.

The County currently uses multiple work order systems. The process for tracking work orders, the information tracked, and storage methodology and system used varies by the division. The County should establish one work order and tracking process. This will allow the Public Works department to maintain all work orders in one system and ensure similar information such as customer, type of request/work order, problem and resolution information is tracked.

Complaints for the County are recorded in multiple systems throughout the County including TIS, AllMax, Stormwater database in Access, Excel and manual files and the Waste Management Database (WM). The County should eliminate the need for multiple service request entry and monitoring. A process should be established that has the complaint information located in one system and integrated with the new CMMS to allow for automation.

Solid Waste has specific needs for managing work orders and customer requests. The new system should be able to have customizable fields to include information required for tracking enforcement and illegal dumping issues. The County should work with Solid Waste to determine necessary information and the number of fields needed. Further, Solid waste utilizes the Waste Management system. Since Waste Management also has access to this system, it should remain, although a linkage from the WM database and the new CMMS should occur.

One uniform system would result in a reduction of data entry time and improve communication between divisions and with external customers. Further, by having the service request in the CMMS, the proactive performance plan would be linked and integrated with short term requests and work tracking.

82. Standardize work scheduling among divisions and fully develop a 2 week schedule procedure and hold Supervisors/managers accountable. Distribute schedule to staff. Relate schedules to annual work plans and routine processes.

A standardized work scheduling process should be instituted among all divisions. Staff should be educated in the use of a formal 2-3 week scheduling process. This process of scheduling would include all work by activity to be accomplished in a specific time period based on a developed annual work plan and outstanding service requests. A systematic involvement of project coordinators and supervisors should occur to assist with the coordination of equipment, labor and material needs, methodology and any special circumstances. A working-level meeting should be planned to discuss the adherence to and future efforts of these schedules. Various points related to this process include:

- allow for maximum use and sharing of limited resources
- minimize work insertions and “brush-fire fighting”
- communicate among all staff with regard to the work plan and available resources
- provide for staff involvement and feedback in planning work

- reduce resource conflicts (such as concrete trucks or mowing, Vegetation Management and Permitted Facilities tasks)

The schedule should be prepared and released for all employees among the divisions to be aware of the planned work. Further, the supervisors should be required to discuss their new schedules, comparing it with the prior two week time frame to determine the adherence to the previous schedule. The supervisors should be held accountable for the schedule completion.

83. Standardize the work reporting for all with resources used (labor, equipment, and materials), accomplishments, and locations documented for all groups. Track all time on job site and link to activities including both the travel and equipment and preparatory.

The County should standardize work reporting among all divisions of Public Works to include all resources including labor, equipment and material and associated costs should be tracked (including avoidable overhead).

This approach would require standardized reporting by crews with easy to retrieve outputs generated by printing or viewing by screen within an established CMMS system. Currently, data used for productivity and unit cost measurement is tracked and input into the TIS, AllMax, Primavera and HERB systems, but is difficult to retrieve and calculate and is inconsistent.

Further, travel time to and from the job site should be tracked as it is a cost to perform an activity. This will allow for better costing of work and give the County a true amount of cost spent on an activity or work effort.

84. Eliminate duplicate work entry process for Traffic Engineering and enter labor, equipment, material, accomplishment, and work order in new CMMS.

Traffic Engineering is currently utilizing the Primavera system for tracking work. Primavera was originally designed for project management and is being utilized by Traffic Engineering for work tracking and monitoring. As a result some of the information is entered into the system multiple times to be able to produce necessary reports and information. Further, some information must still be exported into Excel to allow it to be used for billing. As a result, unnecessary time is utilized performing data entry and producing billing.

The new CMMS should be utilized for tracking labor, equipment, material, accomplishment and work orders. This information should only need to be entered into the system once in a similar format. Further, the system should be able to produce necessary billing through an automated process that does not require export of the data. This should increase the availability of Traffic administrative staff, and allow transfer of one FTE to road and bridge for support of the signs and marking staff.

85. All supervisors with Mosquito Control should utilize the same system for work tracking and planning. Specialized needs such as tracking chemical usage and application rates should be established in the new systems or linked to existing systems.

Each Mosquito control supervisor utilizes a separate system for tracking. Information is difficult to compile and does not utilize similar codes or formats. The Herb database is used for tracking herbicide spraying activities, primavera is used to track mosquito control ditch projects, inspector supervisors utilized various excel sheets and aerial work is tracked in manual logs.

Tracking and storing information in the new CMMS will allow information to be compiled by the entire division in a similar format and allow for all of the relevant information to be used for making management decisions and continuous improvement.

86. Utilize new CMMS for establishing similar billing formats for all divisions with ability for some variation.

As a result of each division utilizing different systems for tracking, work billing is also produced from different systems in different formats. This can make billing received difficult for customers to understand, even for internal billing. For example, Stormwater receives billing from the Road and Bridges and Mosquito Control divisions, yet both bills are in a different format and contain different information. The County should utilize the CMMS to establish a similar format for billing for all divisions with some ability for variation.

Some variation may need to occur based upon unit cost billing versus time and material and the specific needs of the customer. Standard billing capabilities in the CMMS should include the ability to bill by unit cost or time and material, with the ability to add overhead costs for labor and material.

87. Implement a new CMMS that has the ability to integrate with latest technology including GIS and wireless/mobile options.

The County is actively using new technologies such as GIS. Further, the County is looking at other capabilities, such as wireless and mobile options, and has WiFi capabilities at many of the County's administrative facilities. The new CMMS should be able to link to these technologies. In the case of the GIS system, two way communications should be enabled to allow information from the GIS to the CMMS and from the CMMS to the GIS to be transferred. This will ensure that information updated in the GIS will be updated in the CMMS.

Further, with many job sites having a significant travel distance from the yards mobile technology will be needed. This will allow the potential for work entry of work order or daily tracking in the field if necessary.

88. All divisions should create a monthly report in a similar format. Establish a monthly meeting to review data from the CMMS with administrative group responsible for creating an accountability process.

Currently, each division provided a monthly report to the Director of Public Works in a different format. Each division should create a report in a similar format and provide to the Director monthly. This will allow the Director to review the information for the Department as a whole in an easy to understand format and compile summary information.

Further, the reports should be created from data stored and retrieved in the CMMS and include planned versus actual data by activity for labor days, cost, accomplishment, and productivity.

In addition to providing the data to the Director, information from reports and the CMMS should be reviewed by the Administrative group to provide accountability and ensure information is accurately tracked and system goals are being achieved.

89. New CMMS should meet existing HERB systems functions for Mosquito Control (i.e. application rate).

Mosquito Control has unique reporting requirement for the use of chemicals. Some of the databases, including the HERB database, have been specifically established to meet state and billing needs.

The new CMMS should be able to meet these reporting requirements through the use of customizable or "user defined fields" or have the ability to already store information needed such as application rate, type and amount of vegetation and chemical amounts used in multiple unit types such as oz, lbs or gallons.

90. Make information readily available to all employees and train supervisors to utilize. Develop system champions or "super users" in each group. Establish accountability to the planned work and productivity and establish a process to systematically evaluate and monitor unit cost and productivity.

Currently, a variety of systems are used by each division. Within each division, the supervisors have different capabilities and access to data. For example, Road and Bridges enter performance data into the CMMS.

The new CMMS database should allow management to compile comprehensive summaries of accomplished work (i.e. unit costs, work accomplished and dollars expended) and to disseminate this information to all supervisors for work management purposes. Information the system compiles should include total cost, unit cost, and work accomplished by facility, specific location, area or Countywide for each activity. This would create a more businesslike approach and allow management to evaluate the

effectiveness of the work as well as the efficiency of the crews. The chosen CMMS should have these capabilities directly built into the system.

Further, the system should involve management staff in using the information to improve the operations. For this to occur, three criteria must take place: 1) training in the use of the new CMMS system, 2) a realistic performance plan established, and 3) processes set up to systematically review the information. This will allow supervisors to make better informed decisions regarding work performed in the field. Further, information should be made available to employees for review. This will allow them to ensure they are meeting their individual crew goals and assisting the County to improve.

Additional support and coaching should be provided to managers and supervisors that use information to manage. Business processes and training to use those processes must be performed. Those managers utilizing this information to continually improve the organization should be rewarded and those that choose not to use the information should be given guidance and direction to apply in their daily operation.

A monthly review of work done, work accomplished and productivity should be compared against desired goals. The Division managers and supervisors should hold various staff accountable to achieve the goals and to improve in their efforts to perform cost-effective work.

91. Establish a continuous improvement process with a quarterly update given to crews. Provide an annual state of Public Works report to the Director of Public Works that compares planned activities work days, accomplishment, cost, and unit cost versus actual effort. Update County manager with results and provide state of Public Works to BCC.

A systematic method for evaluating effectiveness in the operation is not currently available. The County's mechanism is tracked in various automated databases which does not allow for evaluation for cost effectiveness and/or measurement of efficiency of the entire department. The new CMMS system will have frequency of service, desired quality and quantity of work and unit cost for all activities that can be extracted on a very routine basis by any specific time frame and/or location. By coaching the staff in the use of the system, a comparison can be made which would allow activities that have potential for contracting to be identified, while continually evaluating in-house efficiency.

The County should review all alternatives for providing cost-effective, quality service, and select the options that best meet these criteria. A new activity based system could provide the County with the mechanism to maximize the best use of the public's dollars.

A quarterly meeting should occur where all employees provide summary information on costing, productivity and accomplishment. Actions planned as a result of this information should be outlined. Various activities should be posted for all employees to observe results.

Further, on an annual basis information should be compiled for all divisions into a short report and provided for the Director of Public Works outlining the results of work effort and compliance to the annual work plan. Information on response to customers, performance measures, unit cost, accomplishment and productivity should be provided. Proposed actions to ensure compliance and acknowledgment of success will be provided. Once information is confirmed and reviewed by the Director, the "state of maintenance" should be presented to the Board of County Commissioners.

Summary

The recommendations described above were developed by LAC in conjunction with each division to ultimately improve the County's Public Works maintenance operations effort in a manner that would realize not only fiscal savings but also tremendous empowerment of the labor force as well.

The recommendations were categorized into the four categories including a general category and the basic management functions of Planning, Organizing, and Directing/Controlling. This was done to facilitate a phased implementation of the recommendations by division management with potential assistance from LAC in coaching and guiding the completion. The savings and improved working environment resulting from these recommendations would be rewarding if they were adopted. If not, they would represent critically missed opportunities for the County.

These recommendations have been made with careful analysis, involvement, and discussions with County staff. LAC believes that if implemented, tremendous positive impacts will result from the effectiveness of public dollars expended, efficiency of work performed and a positive attitude by the involvement of all staff in an approach to work being done.

5 - Appendix A-1 and A-2

- **A-1 Rolling Stock Equipment List**
- **A-2 Non-Rolling Stock Equipment List**

Appendix A*

*Please note the equipment data utilized is for a point in time from when the initial data was received. LAC used equipment data supplied from the Fleet Department though some divisions tracked their fleet equipment separately.

There are discrepancies between the fleet data and the division equipment data. LAC has noted these discrepancies in recommendation 73 as an area for improvement. Further these data discrepancies should be resolved prior to using this information for making decisions on a future action on any specific piece of equipment.

Table A-1 Rolling Stock

DIVISION	EQUIP#	LACTYPE	YEAR	DESCRIPTION	BILL CODE	METER TYPE
Admin	157628	SUV	2001	Chevy BLAZER 4X4	B	M
ConstEng	154131	PU 1/2T	1999	DODGE PICKUP	B	M
ConstEng	154985	PU 1/2T	2000	DODGE PICKUP	B	M
ConstEng	154986	PU 1/2T	2000	DODGE PICKUP	B	M
ConstEng	158753	PU 1/2T	2002	FORD F150	B	M
ConstEng	160895	PU 1/2T	2003	DODGE DAKOTA	B	M
ConstEng	165591	PU 1/2T	2006	FORD F150	B	M
ConstEng	165592	PU 1/2T	2006	FORD F150	B	M
ConstEng	165593	PU 1/2T	2006	FORD F150	B	M
ConstEng	165594	PU 1/2T	2006	FORD F150	B	M
ConstEng	166680	PU 1/2T	2006	FORD F150	A	M
ConstEng	153962	SUV	1999	JEEP CHEROKEE	B	M
ConstEng	153963	SUV	1999	JEEP CHEROKEE	B	M
ConstEng	154981	SUV	2000	FORD EXCURSION	B	M
ConstEng	154982	SUV	2000	FORD EXCURSION	B	M
ConstEng	157631	SUV	2001	Chevy Blazer	B	M
ConstEng	159242	SUV	2002	Chevy Blazer	B	M
ConstEng	165554	SUV	2005	FORD EXCURSION	B	M
MosqVeg	129325	DITCH DIGGER	1986	ARDCO DITCHWITCH	A	H
MosqVeg	160703	DOZER	2001	CAT D5M	A	H
MosqVeg	160704	DOZER	2001	POSITRACH DOZER	A	H
MosqVeg	149920	DUMP 18YD	1997	FORD LNT8000	A	H
MosqVeg	151534	DUMP 18YD	1997	FORD TRIAXLE	A	H
MosqVeg	163010	DUMP 18YD	2005	Sterling TRIAXLE	A	H
MosqVeg	167206	DUMP 18YD	2006	FREIGHTLINER TRIAXLE	A	H
MosqVeg	156907	EXCAVATOR	2002	WILCO EXCAVATOR	A	H
MosqVeg	160717	EXCAVATOR	2004	WILCO Excavator Float	A	H
MosqVeg	165501	EXCAVATOR	2005	TEREX EXCAVATOR	A	H
MosqVeg	165509	EXCAVATOR	2005	TEREX EXCAVATOR	A	H
MosqVeg	149921	GRADALL	1996	Gradall XL5100	A	H
MosqVeg	153204	GRADALL	1999	Gradall GW-626-41	A	H
MosqVeg	164303	GRADALL	1996	Gradall XL5200	A	H
MosqVeg	049921	GRADALL RR ENGINE	1996	CUMMINS REAR ENG	A	H
MosqVeg	053204	GRADALL RR ENGINE	1999	Gradall XL4100	A	H
MosqVeg	151536	MOTOR BOAT	1974	AIR BOAT Boat	A	H
MosqVeg	164301	MOTOR BOAT	1974	AIR BOAT Boat	A	H
MosqVeg	133392	PU 1/2T	1987	FORD RANGER	A	M
MosqVeg	133393	PU 1/2T	1987	FORD COMP	A	M
MosqVeg	133395	PU 1/2T	1988	FORD RANGER	A	M
MosqVeg	133396	PU 1/2T	1987	FORD RANGER	A	M
MosqVeg	133406	PU 1/2T	1988	FORD COMP	A	M
MosqVeg	133407	PU 1/2T	1988	FORD RANGER	A	M
MosqVeg	140766	PU 1/2T	1990	FORD RANGER	A	M
MosqVeg	140784	PU 1/2T	1991	FORD 1/2 T	A	M
MosqVeg	142998	PU 1/2T	1993	FORD COMP	A	M
MosqVeg	142999	PU 1/2T	1993	FORD F150	A	M
MosqVeg	143102	PU 1/2T	1993	FORD COMP	A	M
MosqVeg	145624	PU 1/2T	1994	FORD COMP	A	M
MosqVeg	145625	PU 1/2T	1994	FORD RANGER	A	M
MosqVeg	149929	PU 1/2T	1997	FORD COMP	A	M
MosqVeg	149930	PU 1/2T	1997	FORD RANGER	A	M
MosqVeg	151542	PU 1/2T	1998	FORD RANGER	A	M
MosqVeg	156908	PU 1/2T	2002	FORD PICKUP	A	M
MosqVeg	156909	PU 1/2T	2002	FORD F350	A	M
MosqVeg	156910	PU 1/2T	2002	DODGE Ram	A	M
MosqVeg	160705	PU 1/2T	2003	Chevy S10	A	M
MosqVeg	160706	PU 1/2T	2003	Chevy S10	A	M
MosqVeg	160707	PU 1/2T	2003	Chevy S10	A	M
MosqVeg	160708	PU 1/2T	2003	Chevy S10	A	M
MosqVeg	160709	PU 1/2T	2003	FORD F150	A	M
MosqVeg	160710	PU 1/2T	2003	FORD F150	A	M
MosqVeg	160711	PU 1/2T	2003	FORD F150	A	M
MosqVeg	163001	PU 1/2T	2004	FORD F150	A	M
MosqVeg	163002	PU 1/2T	2004	FORD F150	A	M
MosqVeg	163004	PU 1/2T	2005	DODGE DAKOTA	A	M
MosqVeg	163005	PU 1/2T	2005	DODGE DAKOTA	A	M
MosqVeg	163006	PU 1/2T	2005	DODGE DAKOTA	A	M
MosqVeg	163007	PU 1/2T	2005	DODGE DAKOTA	A	M
MosqVeg	163008	PU 1/2T	2005	DODGE DAKOTA	A	M
MosqVeg	164305	PU 1/2T	2006	FORD F250	A	M
MosqVeg	165504	PU 1/2T	2006	FORD F250	A	M
MosqVeg	165505	PU 1/2T	2006	FORD F250	A	M
MosqVeg	163003	PU 1T	2004	FORD F350	A	M
MosqVeg	145643	PU 3/4T	1996	FORD 3/4 T 4X4	A	M
MosqVeg	145644	PU 3/4T	1995	FORD F250	A	M

Table A-1 Rolling Stock – Cont.

DIVISION	EQUIP#	LACTYPE	YEAR	DESCRIPTION	BILL CODE	METER TYPE
MosqVeg	145645	PU 3/4T	1996	FORD 3/4 T 4X4	A	M
MosqVeg	149928	PU 3/4T	1997	FORD 3/4 T 4X4	A	M
MosqVeg	151549	PU 3/4T	1998	FORD 3/4 T 4X4	A	M
MosqVeg	151550	PU 3/4T	1998	FORD 3/4 T 4X4	A	M
MosqVeg	153214	PU 3/4T	2000	DODGE ram2500	A	M
MosqVeg	153215	PU 3/4T	2000	DODGE 3/4 T 4X4	A	M
MosqVeg	160720	PU 3/4T	2005	FORD F250	A	M
MosqVeg	164304	PU 3/4T	2006	FORD F350	A	M
MosqVeg	153212	SMALL ATV	1990	YAMAHA ATV	A	H
MosqVeg	145626	SUV	1994	FORD EXPLORER	A	M
MosqVeg	163139	SUV	2005	FORD EXPEDITION	A	M
MosqVeg	156912	TILLER	2002	VICTOR HYDRO-MUL	A	H
MosqVeg	125493	TRACTOR FARM	1982	ALLIS CHAL 5020	A	H
MosqVeg	125494	TRACTOR FARM	1982	ALLIS CHAL X	A	H
MosqVeg	145641	TRACTOR FARM	1995	FORD 9030	A	H
MosqVeg	160713	TRUCK 1.5T	2003	FORD F550	A	M
MosqVeg	129305	TRUCK 1T	1985	Chevy 1T SERVICE	A	M
MosqVeg	151539	TRUCK 1T	1997	FORD F350	A	M
MosqVeg	135078	TRUCK SPRAY	1987	FORD F8000	A	H
MosqVeg	149911	TRUCK SPRAY	1995	FORD F350	A	M
MosqVeg	129322	TRUCK TRACTOR	1985	GMC GENERAL	A	H
MosqVeg	122508	TRUCK WATER	1982	FORD F700	A	H
R&B	152372	BACKHOE LOADER	1995	CAT 416B	A	H
R&B	152748	BACKHOE LOADER	1996	CAT 426C CAT	A	H
R&B	152749	BACKHOE LOADER	1996	CAT 426C CAT	A	H
R&B	157494	BACKHOE LOADER	1997	BACKHOE 426C CAT	A	H
R&B	161411	BACKHOE LOADER	2003	CAT 430d	F	H
R&B	162348	BACKHOE LOADER	2004	CAT 430d	F	H
R&B	165566	COMPACTOR	2005	CAT COMPACTOR	F	H
R&B	146259	DOZER	1994	CAT D4	A	H
R&B	136217	DUMP 18YD	1988	FREIGHTLINER TRIAXLE	A	H
R&B	143694	DUMP 18YD	1993	VOLVO TRIAXLE	A	H
R&B	143695	DUMP 18YD	1993	WHITE TRIAXLE	A	H
R&B	143696	DUMP 18YD	1993	VOLVO TRIAXLE	A	H
R&B	143697	DUMP 18YD	1993	VOLVO TRIAXLE	A	H
R&B	149652	DUMP 18YD	1996	Peterbilt TRIAXLE	A	H
R&B	149653	DUMP 18YD	1996	Peterbilt TRIAXLE	A	H
R&B	149654	DUMP 18YD	1996	Peterbilt TRIAXLE	A	H
R&B	156619	DUMP 18YD	2000	Sterling TRIAXLE	A	H
R&B	156620	DUMP 18YD	2000	Sterling TRIAXLE	A	H
R&B	156621	DUMP 18YD	2000	Sterling TRIAXLE	A	H
R&B	156622	DUMP 18YD	2000	Sterling TRIAXLE	A	H
R&B	156623	DUMP 18YD	2000	Sterling TRIAXLE	A	H
R&B	157895	DUMP 18YD	2001	Sterling TRIAXLE	A	H
R&B	157896	DUMP 18YD	2001	Sterling TRIAXLE	A	H
R&B	159415	DUMP 18YD	2002	Sterling TRIAXLE	A	H
R&B	159416	DUMP 18YD	2002	Sterling TRIAXLE	A	H
R&B	161857	DUMP 18YD	2004	Sterling C-8000 PUM	A	H
R&B	161858	DUMP 18YD	2004	Sterling C-8000 PUM	A	H
R&B	164606	DUMP 18YD	2005	Sterling TRIAXLE	A	H
R&B	164607	DUMP 18YD	2005	Sterling TRIAXLE	A	H
R&B	151920	DUMP 1T	1997	FORD 1T DUMP	B	M
R&B	152956	DUMP 1T	1998	Chevy 3500HD	B	M
R&B	152957	DUMP 1T	1998	Chevy 3500HD	B	M
R&B	133865	DUMP 6YD	1987	FORD 6 YD	A	H
R&B	143707	DUMP 6YD	1993	FORD 6 YD	A	H
R&B	143708	DUMP 6YD	1993	FORD F800	A	H
R&B	144605	DUMP 6YD	1993	FORD F800	A	H
R&B	144606	DUMP 6YD	1993	FORD 6 YD	A	H
R&B	161424	DUMP 6YD	2004	Sterling sand truck	A	H
R&B	162349	EXCAVATOR	2004	CAT 330L	F	H
R&B	135448	FLATBED CREW	1988	GMC 7000	A	H
R&B	135449	FLATBED CREW	1988	GMC FLAT/CREW	A	H
R&B	136430	FLATBED CREW	1987	FORD F8000	A	H
R&B	156416	FLATBED CREW	2000	FORD F550	A	M
R&B	156616	FLATBED CREW	2000	International FLAT/CREW	A	H
R&B	156617	FLATBED CREW	2000	International FLAT/CREW	A	H
R&B	157526	FLATBED CREW	2001	International FLAT/CREW	A	H
R&B	157527	FLATBED CREW	2001	International FLAT/CREW	A	H
R&B	157528	FLATBED CREW	2001	International FLAT/CREW	A	H
R&B	157529	FLATBED CREW	2001	International FLAT/CREW	A	H
R&B	161447	FLATBED CREW	2003	Sterling acterra	A	H
R&B	161448	FLATBED CREW	2003	Sterling acterra	A	H
R&B	142821	GRADALL	1991	Gradall G660E	A	H
R&B	149300	GRADALL	1996	Gradall XL4100	F	H

Table A-1 Rolling Stock – Cont.

DIVISION	EQUIP#	LACTYPE	YEAR	DESCRIPTION	BILL CODE	METER TYPE
R&B	151551	GRADALL	1997	BADGER 460	F	H
R&B	157162	GRADALL	2000	Gradall XL4100	A	H
R&B	159231	GRADALL	2002	Gradall XL3100	A	H
R&B	160838	GRADALL	2003	Gradall XL3100	A	H
R&B	164574	GRADALL	2005	Gradall XL4100	F	H
R&B	165625	GRADALL	2006	Gradall XL4100	F	H
R&B	042821	GRADALL RR ENGINE	1991	Gradall REAR ENG	A	H
R&B	049300	GRADALL RR ENGINE	1996	CUMMINS REAR ENG	F	H
R&B	051551	GRADALL RR ENGINE	1997	CUMMINS REAR ENG	F	H
R&B	057162	GRADALL RR ENGINE	2000	Gradall REAR ENG	A	H
R&B	144153	GRADER	1989	GRADER 12H CAT	F	H
R&B	150444	GRADER	1996	GRADER GRADER	F	H
R&B	151645	GRADER	1994	GRADER GRADER	F	H
R&B	152848	GRADER	1998	GRADER 12H CAT	F	H
R&B	153679	GRADER	1998	GRADER 12H CAT	F	H
R&B	153829	GRADER	1998	GRADER 12H CAT	F	H
R&B	153830	GRADER	1998	GRADER 12H CAT	A	H
R&B	157794	GRADER	2001	GRADER CAT	F	H
R&B	157796	GRADER	2001	GRADER 12H CAT	F	H
R&B	161506	GRADER	2003	GRADER 12H CAT	F	H
R&B	162346	GRADER	2004	CAT M413XT	A	H
R&B	164578	GRADER	2005	CAT 12H CAT	A	H
R&B	161094	LOADER SKID	2003	CAT 262	A	H
R&B	166701	LOADER SKID	2006	CAT LOADER	A	H
R&B	149624	LOADER WHEEL	1994	CAT 950F	A	H
R&B	152370	LOADER WHEEL	1995	LOADER 966F	F	H
R&B	152371	LOADER WHEEL	1995	CAT 950F	F	H
R&B	153965	LOADER WHEEL	1999	CAT 950G LOADR	F	H
R&B	155920	LOADER WHEEL	1998	CAT 950G LOADR	F	H
R&B	160377	LOADER WHEEL	2002	CAT 950G LOADR	A	H
R&B	161446	LOADER WHEEL	2000	CAT 950G LOADR	A	H
R&B	163117	LOADER WHEEL	2004	CAT 950G LOADR	A	H
R&B	166682	LOADER WHEEL	2006	CAT LOADER	A	H
R&B	137366	MIXER	1989	BEST CONCRETSAW	A	H
R&B	144131	MIXER	1993	CEMENT MXR MIXER	A	H
R&B	144240	MIXER	1990	REX MIXER	F	H
R&B	146502	MIXER	1995	STONE MIXER	A	H
R&B	152750	MIXER	1998	STONE 65CM	A	H
R&B	152751	MIXER	1998	STONE 65CM	A	H
R&B	152752	MIXER	1998	STONE 95CM	A	H
R&B	159060	MIXER	2002	BOMAG MIXER	A	H
R&B	162697	MIXER	2004	WHITEMAN MIXER	A	H
R&B	163728	MOWER	2004	SCAG MOWER	A	H
R&B	141646	MOWER BUSH HOG	1991	BATWING BUSH	A	H
R&B	143119	MOWER BUSH HOG	1992	BUSH HOG 3615RPR	A	M
R&B	152998	MOWER BUSH HOG	1998	BUSH HOG 2610	A	M
R&B	152999	MOWER BUSH HOG	1998	BUSH HOG 2610	A	M
R&B	153000	MOWER BUSH HOG	1997	BUSH HOG 26LEGEND	A	H
R&B	156499	MOWER BUSH HOG	1999	BUSH HOG MOWER	A	H
R&B	156500	MOWER BUSH HOG	1999	BUSH HOG MOWER	A	H
R&B	156810	MOWER BUSH HOG	2000	BUSH HOG MOWER	A	H
R&B	160364	MOWER BUSH HOG	2002	BUSH HOG MOWER	A	H
R&B	160365	MOWER BUSH HOG	2002	BUSH HOG MOWER	A	H
R&B	166356	MOWER BUSH HOG	2006	BUSH HOG MOWER	A	H
R&B	166358	MOWER BUSH HOG	2006	BUSH HOG MOWER	A	H
R&B	166365	MOWER BUSH HOG	2006	BUSH HOG MOWER	A	H
R&B	138950	MOWER RIDING	1989	HOGG MOWER	A	M
R&B	143877	MOWER RIDING	1993	GRAVELY 40	A	M
R&B	143878	MOWER RIDING	1993	GRAVELY 40	A	H
R&B	156683	MOWER RIDING	2000	SCAG RIDING MWR	A	H
R&B	156883	MOWER RIDING	2000	SCAG RIDING MWR	A	H
R&B	157827	MOWER RIDING	2002	HUSTLER MOWER	F	H
R&B	159748	MOWER RIDING	2002	SCAG RIDING MWR	A	H
R&B	161751	MOWER RIDING	2003	TIGER MOWER	A	H
R&B	161920	MOWER RIDING	2005	SCAG STT61A-27KA	A	H
R&B	162686	MOWER RIDING	2003	SCAG MOWER	A	H
R&B	162687	MOWER RIDING	2004	SCAG MOWER	A	H
R&B	162688	MOWER RIDING	2004	SCAG MOWER	A	H
R&B	165673	MOWER RIDING	2006	SCAG RIDING MWR	A	H
R&B	149822	MOWER SLOPE	1995	TIGER SLOPE	A	H
R&B	155296	MOWER SLOPE	1999	ALAMO SLOPE	A	H
R&B	155297	MOWER SLOPE	1999	ALAMO SLOPE	A	H
R&B	156592	MOWER SLOPE	2000	ALAMO SLOPE	A	H
R&B	162335	PU 1.5T	2004	FORD F450	B	M
R&B	162336	PU 1.5T	2004	FORD F450	B	M

Table A-1 Rolling Stock – Cont.

DIVISION	EQUIP#	LACTYPE	YEAR	DESCRIPTION	BILL CODE	METER TYPE
R&B	164561	PU 1.5T	2005	FORD F550	B	M
R&B	154175	PU 1/2T	1999	DODGE D-150	B	M
R&B	155895	PU 1/2T	2000	DODGE ram1500	B	M
R&B	159169	PU 1/2T	2002	DODGE Ram	B	M
R&B	159170	PU 1/2T	2002	DODGE ram1500	B	M
R&B	159171	PU 1/2T	2002	DODGE ram1500	B	M
R&B	159172	PU 1/2T	2002	DODGE ram1500	B	M
R&B	160887	PU 1/2T	2003	FORD F150	B	M
R&B	161072	PU 1/2T	2003	FORD CREW CAB	B	M
R&B	161865	PU 1/2T	2004	FORD F250	B	M
R&B	161866	PU 1/2T	2004	FORD F250	B	M
R&B	161877	PU 1/2T	2004	FORD F150	B	M
R&B	161878	PU 1/2T	2004	FORD F150	B	M
R&B	161885	PU 1/2T	2004	FORD PICKUP	A	M
R&B	162312	PU 1/2T	2004	DODGE DAKOTA	B	M
R&B	164575	PU 1/2T	2005	FORD F150	A	M
R&B	165604	PU 1/2T	2006	FORD F150	B	M
R&B	159184	PU 1T	2001	DODGE 3500HD	B	M
R&B	161079	PU 1T	2003	FORD F350	B	M
R&B	161080	PU 1T	2003	FORD F350	B	M
R&B	161081	PU 1T	2003	FORD F350	B	M
R&B	161403	PU 1T	2003	FORD F350	B	M
R&B	162316	PU 1T	2004	FORD F350	B	M
R&B	162338	PU 1T	2004	FORD F350	B	M
R&B	162343	PU 1T	2004	FORD F350	B	M
R&B	164538	PU 1T	2005	FORD F350	B	M
R&B	164539	PU 1T	2005	FORD F350	B	M
R&B	164540	PU 1T	2005	FORD F350	B	M
R&B	164541	PU 1T	2005	FORD F350	B	M
R&B	164542	PU 1T	2005	FORD F350	B	M
R&B	165615	PU 1T	2006	FORD F350	B	M
R&B	155742	PU 3/4T	2000	DODGE 3/4 T	B	M
R&B	159187	PU 3/4T	2002	DODGE 3/4 QUAD	B	M
R&B	161867	PU 3/4T	2004	FORD F250	B	M
R&B	162337	PU 3/4T	2004	FORD F250	B	M
R&B	164511	PU 3/4T	2005	FORD F250	B	M
R&B	164513	PU 3/4T	2004	FORD F250	B	M
R&B	165600	PU 3/4T	2006	FORD F250	B	M
R&B	165601	PU 3/4T	2006	FORD F250	B	M
R&B	165602	PU 3/4T	2006	FORD F250	B	M
R&B	165603	PU 3/4T	2006	FORD F250	B	M
R&B	120117	ROLLER RUBBER	1980	HYSTER C530A	F	H
R&B	140108	ROLLER RUBBER	1985	HYSTER ROLLER	F	H
R&B	145210	ROLLER STEEL	1993	INGERSOLL SD-150D	F	H
R&B	154285	ROLLER STEEL	1998	INGERSOLL DD65ROLLER	A	H
R&B	157620	ROLLER STEEL	1995	CAT CB534C	F	H
R&B	162690	ROLLER STEEL	2005	WACKER RD11	A	H
R&B	163126	ROLLER STEEL	2004	WACKER RD11	A	H
R&B	156421	SPYDER	1999	KAISER SPIDER	A	H
R&B	165998	SPYDER	2005	KAISER SPIDER	A	H
R&B	157629	SUV	2001	Chevy Blazer	B	M
R&B	161898	SUV	2004	FORD EXPLORER	B	M
R&B	165583	SUV	2006	FORD EXPLORER	B	M
R&B	159946	SWEEPER	2002	TENNANT Sweeper	A	H
R&B	164529	SWEEPER	2005	TENNANT CENTURION	A	H
R&B	135439	TAR DISTRIBUTOR	1988	FORD Tar Spreader	A	H
R&B	140511	TAR DISTRIBUTOR	1990	FORD F800	A	H
R&B	159749	TILLER	1999	BOMAG TILLER	A	H
R&B	139996	TRACTOR FARM	1990	FORD BROOM 6610	A	H
R&B	144975	TRACTOR FARM	1993	FORD BROOM 6610	A	H
R&B	148309	TRACTOR FARM	1995	DEERE Tractor	A	H
R&B	149815	TRACTOR FARM	1995	DEERE SLOPE	F	H
R&B	152963	TRACTOR FARM	1998	FORD 10FT	A	H
R&B	152964	TRACTOR FARM	1998	FORD 6610 R2	A	H
R&B	152965	TRACTOR FARM	1998	FORD 6610	A	H
R&B	152966	TRACTOR FARM	1998	FORD 6610	A	H
R&B	155295	TRACTOR FARM	1999	MASSEY SLOPE	F	H
R&B	155298	TRACTOR FARM	1999	MASSEY SLOPE	F	H
R&B	155299	TRACTOR FARM	1999	MASSEY SLOPE	A	H
R&B	155300	TRACTOR FARM	1999	MASSEY Tractor	A	H
R&B	155301	TRACTOR FARM	1999	MASSEY Tractor	F	H
R&B	155302	TRACTOR FARM	1999	MASSEY SLOPE	A	H
R&B	155303	TRACTOR FARM	1999	MASSEY 6610	A	H
R&B	156361	TRACTOR FARM	2000	MASSEY CHEMICAL	F	H
R&B	156362	TRACTOR FARM	2000	MASSEY CHEMICAL	A	H

Table A-1 Rolling Stock – Cont.

DIVISION	EQUIP#	LACTYPE	YEAR	DESCRIPTION	BILL CODE	METER TYPE
R&B	156363	TRACTOR FARM	2000	MASSEY CHEMICAL	A	H
R&B	156593	TRACTOR FARM	2000	MASSEY SLOPE	A	H
R&B	157141	TRACTOR FARM	2000	HOLLAND GRADING	A	H
R&B	160375	TRACTOR FARM	2002	KUBOTA M9000	A	M
R&B	161417	TRACTOR FARM	2003	FORD Tractor	F	H
R&B	161587	TRACTOR FARM	2004	J DEERE Tractor	F	H
R&B	163125	TRACTOR FARM	2004	New Holland Tractor	F	H
R&B	163102	TRACTOR MOWER	2005	KUBOTA Tractor	A	H
R&B	164528	TRACTOR MOWER	2005	New Holland Tractor	A	H
R&B	165561	TRACTOR MOWER	2006	AGCO CHALLNGR	A	H
R&B	165568	TRACTOR MOWER	2006	AG Tractor	F	H
R&B	151685	TRUCK 1T	1997	FORD 1T SERVICE	B	M
R&B	152954	TRUCK 1T	1998	Chevy C3500	B	M
R&B	154694	TRUCK 1T	1999	Chevy 1T CREW	B	M
R&B	154721	TRUCK 1T	1999	Chevy 1T CREW	B	M
R&B	139431	TRUCK BUCKET	1990	FORD REACH AP70	A	H
R&B	164598	TRUCK BUCKET	2005	Sterling acterra	A	H
R&B	164599	TRUCK BUCKET	2005	Sterling acterra	A	H
R&B	154975	TRUCK CLAM	2000	Sterling CC/CLAM	A	H
R&B	165557	TRUCK CLAM	2006	Sterling CLAM	A	H
R&B	140494	TRUCK FLATBED	1990	FORD FLTBED	A	H
R&B	140495	TRUCK FLATBED	1990	FORD FLTBED	A	H
R&B	143710	TRUCK FLATBED	1993	FORD F800	A	H
R&B	144732	TRUCK FLATBED	1993	FORD F800	A	H
R&B	156611	TRUCK FLATBED	2000	Sterling FLTBED	A	H
R&B	156612	TRUCK FLATBED	2000	Sterling FLTBED	A	H
R&B	156613	TRUCK FLATBED	2000	Sterling FLTBED	A	H
R&B	161428	TRUCK FLATBED	2004	Sterling acterra	A	H
R&B	163113	TRUCK FLATBED	2004	Sterling acterra	A	H
R&B	164570	TRUCK FLATBED	2005	Sterling acterra	A	H
R&B	164571	TRUCK FLATBED	2005	Sterling acterra	A	H
R&B	154976	TRUCK RECYCLE	2000	Sterling RECYCLE TK	A	H
R&B	148019	TRUCK SCRAPPER	1995	FORD F800	A	H
R&B	129804	TRUCK TRACTOR	1985	FORD TRACK TRK	A	H
R&B	148030	TRUCK TRACTOR	1995	FREIGHTLINER TRACK TRK	A	H
R&B	161860	TRUCK TRACTOR	2004	Sterling C-8000 PUM	A	H
R&B	148039	TRUCK VACUUM	1995	WHITE VAC B-15	A	H
R&B	157819	TRUCK VACUUM	2002	Sterling VAC TRK	A	H
R&B	137750	TRUCK WATER	1986	FORD F800 4.0 T	F	H
R&B	140644	TRUCK WATER	1987	FORD LNT8000	A	H
R&B	163105	TRUCK WATER	2004	Sterling WATER WAGN	A	H
R&B	152714	VAN	1998	FORD VAN PASS	B	M
R&B	157815	VAN	2001	GMC VAN PASS	B	M
R&B	163122	VAN	2004	Chevy VAN CARGO	A	M
SolidWaste	159959	COMPACTOR	2000	CAT 826G	F	H
SolidWaste	161052	COMPACTOR	2001	CAT 836G	F	H
SolidWaste	162360	COMPACTOR	2003	CAT COMPACTOR	F	H
SolidWaste	164211	COMPACTOR	2005	CAT 826G	F	H
SolidWaste	154978	DOZER	1999	CAT D6R-LGP	F	H
SolidWaste	156974	DOZER	2000	CAT D6RLGP	F	H
SolidWaste	156975	DOZER	2000	CAT D6RLGP	F	H
SolidWaste	156976	DOZER	2000	CAT D6RLGP	F	H
SolidWaste	162361	DOZER	2004	CAT D6N	F	H
SolidWaste	164600	DOZER	2005	CAT D6RII DS	A	H
SolidWaste	166690	DOZER	2006	CAT D6RXWDS	F	H
SolidWaste	148342	DUMP 18YD	1995	FREIGHTLINER FLD1205D	A	H
SolidWaste	148342	DUMP 18YD	1995	FREIGHTLINER FLD1205D	A	H
SolidWaste	148343	DUMP 18YD	1995	FREIGHTLINER FLD120SD	F	H
SolidWaste	166678	DUMP 25YD	2003	CAT 725E	F	H
SolidWaste	152747	DUMP OFFRD	1997	VOLVO A35C DUMP	F	H
SolidWaste	159962	DUMP OFFRD	2002	CAT 725G	F	H
SolidWaste	159963	DUMP OFFRD	2002	CAT 725G	F	H
SolidWaste	159964	DUMP OFFRD	2002	CAT 725G	F	H
SolidWaste	159965	DUMP OFFRD	2002	CAT 725G	F	H
SolidWaste	159966	DUMP OFFRD	2002	CAT 725G	F	H
SolidWaste	154944	EXCAVATOR	1999	LINKBELT 3400QLF	F	H
SolidWaste	156977	EXCAVATOR	2001	CAT 330BL	A	H
SolidWaste	164862	EXCAVATOR	2005	CAT 330CL	A	H
SolidWaste	153416	GRADER	1997	GRADER 12H CAT	F	H
SolidWaste	164861	LOADER SKID	2005	CAT 262	A	H
SolidWaste	153977	LOADER WHEEL	1996	CAT 980G	F	H
SolidWaste	159957	LOADER WHEEL	2000	CAT 966G	F	H
SolidWaste	159958	LOADER WHEEL	2000	CAT 966G	F	H
SolidWaste	159960	LOADER WHEEL	2002	CAT 966G	F	H
SolidWaste	159961	LOADER WHEEL	2002	CAT 966G	F	H

Table A-1 Rolling Stock – Cont.

DIVISION	EQUIP#	LACTYPE	YEAR	DESCRIPTION	BILL CODE	METER TYPE
SolidWaste	164597	LOADER WHEEL	2005	CAT 966G	A	H
SolidWaste	154946	MOWER	1999	SCHULTY MOWER	A	H
SolidWaste	157971	MOWER BUSH HOG	2001	BUSH HOG 3615RPR	A	H
SolidWaste	141293	MOWER RIDING	1990	GRAVELY MOWER	A	M
SolidWaste	151651	MOWER RIDING	1997	JACOBSON MOWER	A	H
SolidWaste	155294	MOWER RIDING	2001	KUBOTA MOWER	A	H
SolidWaste	157428	PU 1/2T	2001	FORD TRACK TRK	B	M
SolidWaste	157429	PU 1/2T	2001	FORD F150	B	M
SolidWaste	159167	PU 1/2T	2002	DODGE PICKUP	B	M
SolidWaste	159267	PU 1/2T	2003	DODGE ram1500	B	M
SolidWaste	165622	PU 1/2T	2006	FORD F150	B	M
SolidWaste	165623	PU 1/2T	2001	FORD F150	B	M
SolidWaste	164518	PU 1T	2005	FORD F250	B	M
SolidWaste	164572	PU 1T	2005	FORD F250	B	M
SolidWaste	155918	PU 3/4T	2000	FORD F250	B	M
SolidWaste	161071	PU 3/4T	2003	FORD F250	B	M
SolidWaste	161073	PU 3/4T	2003	FORD F250	B	M
SolidWaste	161074	PU 3/4T	2003	FORD F250	B	M
SolidWaste	162318	PU 3/4T	2003	FORD 3/4 CREW	B	M
SolidWaste	162319	PU 3/4T	2004	FORD CREW CAB	B	M
SolidWaste	162320	PU 3/4T	2004	FORD F250	B	M
SolidWaste	159751	ROLLER RUBBER	2002	CAT SKID ROLR	F	H
SolidWaste	153585	ROLLER STEEL	1996	HOLMES ROLLER	A	H
SolidWaste	154979	SUV	2000	DODGE DURANGO	A	M
SolidWaste	157630	SUV	2001	Chevy Blazer	B	M
SolidWaste	157829	SUV	2001	Chevy Blazer	B	M
SolidWaste	161884	SUV	2004	FORD EXPLORER	B	M
SolidWaste	152262	TRACTOR BROOM	1997	BROCE RC300	A	H
SolidWaste	149625	TRACTOR FARM	1995	FORD 345D	A	H
SolidWaste	151080	TRACTOR FARM	1996	CAT CHALLNGR	F	H
SolidWaste	157421	TRACTOR FARM	2001	MASSEY 4263	A	H
SolidWaste	157422	TRACTOR FARM	2001	MASSEY Tractor	F	H
SolidWaste	155293	TRACTOR MOWER	2000	KUBOTA Tractor	A	H
SolidWaste	154964	TRUCK 1T	2000	FORD F550	B	M
SolidWaste	145494	TRUCK RECYCLE	1994	FORD F800	A	H
SolidWaste	154315	TRUCK TRACTOR	1999	FREIGHTLINER TRACK TRK	A	M
SolidWaste	154316	TRUCK TRACTOR	1999	FREIGHTLINER TRACK TRK	F	M
SolidWaste	154317	TRUCK TRACTOR	1999	FREIGHTLINER TRACK TRK	A	M
SolidWaste	154318	TRUCK TRACTOR	1999	FREIGHTLINER TRACK TRK	A	M
SolidWaste	156983	TRUCK TRACTOR	2001	Sterling TRACK TRK	A	M
SolidWaste	156984	TRUCK TRACTOR	2001	Sterling TRACK TRK	A	M
SolidWaste	156985	TRUCK TRACTOR	2001	Sterling TRACK TRK	A	M
SolidWaste	156986	TRUCK TRACTOR	2001	Sterling TRACK TRK	A	M
SolidWaste	163128	TRUCK TRACTOR	2005	FREIGHTLINER TRACK TRK	A	M
SolidWaste	164567	TRUCK TRACTOR	2005	FREIGHTLINER TRACK TRK	A	M
SolidWaste	164568	TRUCK TRACTOR	2005	FREIGHTLINER TRACK TRK	A	M
SolidWaste	164569	TRUCK TRACTOR	2005	FREIGHTLINER TRACK TRK	A	M
SolidWaste	159967	TRUCK WATER	2000	CAT 725G	F	H
SolidWaste	145272	VAN	1994	FORD VAN PASS	A	M
SolidWaste	152898	VAN	1987	GMC VAN PASS	A	M
Traffic	153981	MINIVAN	1999	DODGE CARAVA PAS	B	M
Traffic	162332	MINIVAN	2004	FORD ECONOLINE	B	M
Traffic	139818	PAINT STRIPER	1990	FORD STRIPER TR	A	H
Traffic	139818	PAINT STRIPER	1990	FORD STRIPER TR	A	H
Traffic	156431	PU 1.5T	2000	FORD F450	B	M
Traffic	156433	PU 1.5T	2000	FORD F450	B	M
Traffic	156987	PU 1.5T	2001	FORD F450	B	M
Traffic	161082	PU 1.5T	2003	FORD F450	B	M
Traffic	162321	PU 1.5T	2004	FORD F450	B	M
Traffic	164560	PU 1.5T	2005	FORD F450	B	M
Traffic	158755	PU 1/2T	2002	DODGE D150	B	M
Traffic	156432	PU 1T	2000	FORD 1T SERVICE	B	M
Traffic	157512	PU 3/4T	2001	DODGE 2500	A	M
Traffic	157513	PU 3/4T	2001	DODGE ram2500	B	M
Traffic	161882	PU 3/4T	2004	FORD F250	B	M
Traffic	164514	PU 3/4T	2005	FORD F250	B	M
Traffic	165596	PU 3/4T	2006	FORD F250	B	M
Traffic	165617	PU 3/4T	2006	FORD F250	B	M
Traffic	165632	PU 3/4T	2006	FORD F250	A	M
Traffic	163137	SEDAN	2005	FORD TAURUS	B	M
Traffic	163138	SEDAN	2005	FORD TAURUS	B	M
Traffic	143962	TRUCK BUCKET	1993	FORD LIFT-LAH37	A	H
Traffic	149885	TRUCK PLATFORM	1996	FORD F800	A	H
Traffic	151827	TRUCK STAKEBED	1998	FORD F800	B	H
Traffic	162341	VAN	2004	FORD ECONOLINE	B	M

Table A-1 Rolling Stock – Cont.

DIVISION	EQUIP#	LACTYPE	YEAR	DESCRIPTION	BILL CODE	METER TYPE
Traffic	156415	VAN BUCKET	2000	FORD BUCKET VAN	B	M
Utilities	149623	BACKHOE LOADER	1994	CAT 416B	B	H
Utilities	159251	DUMP 1T	2002	Chevy SILVERADO	A	M
Utilities	155760	EXCAVATOR	1999	Bobcat MINI-EXCAV	B	H
Utilities	162663	MOWER BUSH HOG	2003	BUSH HOG 3710	A	H
Utilities	154717	PU 1/2T	1999	GMC SONOMA	B	M
Utilities	157621	PU 1/2T	2001	GMC COMP	B	M
Utilities	157622	PU 1/2T	2001	GMC COMP	B	M
Utilities	157623	PU 1/2T	2001	GMC SONOMA	B	M
Utilities	157624	PU 1/2T	2001	GMC SONOMA	B	M
Utilities	157625	PU 1/2T	2001	GMC SONOMA	B	M
Utilities	157626	PU 1/2T	2001	GMC SONOMA	B	M
Utilities	157805	PU 1/2T	2001	FORD RANGER	B	M
Utilities	157806	PU 1/2T	2001	FORD RANGER	B	M
Utilities	159247	PU 1/2T	2002	DODGE COMP EXT	B	M
Utilities	159248	PU 1/2T	2002	DODGE COMP EXT	B	M
Utilities	160875	PU 1/2T	2003	FORD F150	B	M
Utilities	160878	PU 1/2T	2003	FORD F150	B	M
Utilities	161084	PU 1/2T	2003	FORD RANGER	B	M
Utilities	161085	PU 1/2T	2003	FORD RANGER	B	M
Utilities	161086	PU 1/2T	2003	FORD RANGER	B	M
Utilities	161087	PU 1/2T	2003	FORD RANGER	B	M
Utilities	161092	PU 1/2T	2003	FORD RANGER	B	M
Utilities	161868	PU 1/2T	2004	FORD F150	A	M
Utilities	161870	PU 1/2T	2004	FORD RANGER	A	M
Utilities	163134	PU 1/2T	2005	FORD F150	A	M
Utilities	164559	PU 1/2T	2005	FORD RANGER	B	M
Utilities	162344	PU 1T	2004	FORD F350	B	M
Utilities	163110	PU 1T	2004	FORD F350	A	M
Utilities	157508	PU 3/4T	2001	DODGE 3/4 T SERV	B	M
Utilities	157510	PU 3/4T	2001	DODGE 3/4 T SERV	B	M
Utilities	157511	PU 3/4T	2001	DODGE 3/4 T SERV	B	M
Utilities	165597	PU 3/4T	2006	FORD F250	B	M
Utilities	165598	PU 3/4T	2006	FORD F250	B	M
Utilities	165599	PU 3/4T	2006	FORD F250	B	M
Utilities	166679	PU 3/4T	2006	FORD F250	A	M
Utilities	159241	SUV	2002	Chevy Blazer	B	M
Utilities	161864	SUV	2004	FORD EXPLORER	B	M
Utilities	162326	SUV	2004	FORD EXPLORER	A	M
Utilities	163143	SUV	2005	FORD EXPLORER	B	M
Utilities	165584	SUV	2006	FORD EXPLORER	B	M
Utilities	145JDT	TRACTOR FARM	1994	DEERE 870	A	H
Utilities	150079	TRACTOR FARM	1996	DEERE 1070	A	H
Utilities	148003	TRACTOR MOWER	1992	J DEERE 37N84-RJK	A	H
Utilities	163097	TRACTOR MOWER	2004	KUBOTA Tractor	A	H
Utilities	156424	TRUCK 1T	2000	DODGE 1T SERVICE	B	M
Utilities	156425	TRUCK 1T	2000	DODGE 1T SERVICE	B	M
Utilities	157648	TRUCK 1T	2001	DODGE 1T SERVICE	B	M
Utilities	162327	VAN	2004	FORD ECONOLINE	B	M

Table A-2 Non-Rolling Stock

DIVISION	EQUIP#	LACTYPE	YEAR	DESCRIPTION	BILL CODE	METER TYPE
Admin	770301		2001	PUBLIC OPERATIONS	A	M
ConstEng	105304	TRAILER	1973	SNOWCO TRAILER	A	M
ConstEng	770320		2001	CONSTRUCT ENGINEER	A	H
MosqVeg	143104	FORKLIFT	1980	ALLIS CHAL Forklift	A	M
MosqVeg	165508	GENERATOR STATIONARY	2006	DETROIT Generator	F	H
MosqVeg	153208	PUMP	2000	HYDROSEED Pump	A	H
MosqVeg	00022A	SPRAYER	1990	ADULTI CHEM	A	M
MosqVeg	00026A	SPRAYER	1990	ADULTI CHEM	A	M
MosqVeg	00044A	SPRAYER	1990	ADULTI CHEM	A	M
MosqVeg	00046A	SPRAYER	1990	ADULTI CHEM	A	M
MosqVeg	00047A	SPRAYER	1990	ADULTI CHEM	A	M
MosqVeg	00048A	SPRAYER	1990	ADULTI CHEM	A	M
MosqVeg	00052A	SPRAYER	1986	ADULTI CHEM	A	M
MosqVeg	00054A	SPRAYER	1990	ADULTI CHEM	A	M
MosqVeg	00058A	SPRAYER	1990	ADULTI CHEM	A	M
MosqVeg	00060A	SPRAYER	1990	ADULTI CHEM	A	M
MosqVeg	00061A	SPRAYER	1990	ADULTI CHEM	A	M
MosqVeg	035078	SPRAYER	1987	PERKINS SPRAYER	A	H
MosqVeg	053214	SPRAYER	1990	ADULTI CHEM	A	H
MosqVeg	063003	SPRAYER	1990	ADULTI CHEM	A	H
MosqVeg	064304	SPRAYER	1990	ADULTI CHEM	A	H
MosqVeg	153210	TRAILER	2001	UTILITY TRAILER	A	H
MosqVeg	770300		2001	MOSQUITO CONTROL	A	K
R&B	161763	AIR CURTAIN BLOWER	2003	air curtain BLOWER	F	H
R&B	141018	BLOWER	1990	REINCO MULCHER	A	H
R&B	166685	BUCKET	2006	CAT BUCKET	A	H
R&B	153906	CHIPPER	1999	VERMEER BC1250A	A	H
R&B	160459	CHIPPER	2002	DYNAMIC WOOD CHPPR	A	H
R&B	161422	CHIPPER	2003	Cone Head CHIPPER	A	H
R&B	162745	CHIPPER	2005	Cone Head 500	A	H
R&B	166407	CLAM UNIT	2006	EFFER CLAM	F	H
R&B	166702	COLD PLANNER	2006	CAT PLANER	A	H
R&B	128016	COMPRESSOR	1983	INGERSOLL COMPRESSOR	A	H
R&B	141129	CURBING MACHINE	1990	CURBING MACHINE	A	H
R&B	144976	CURBING MACHINE	1993	X CURBER	A	H
R&B	166683	FORK ATTACHMENT	2006	CAT FORK	A	H
R&B	166705	FORK ATTACHMENT	2006	CAT FORK	A	H
R&B	128720	FORKLIFT	1984	ALLIS CHAL Forklift	A	H
R&B	130436	FORKLIFT	1985	Mitsubishi Forklift	A	H
R&B	145551	FORKLIFT	1989	CAT Forklift	A	H
R&B	135536	GENERATOR PORTABLE	1988	WINCO SPE4000	A	H
R&B	135537	GENERATOR PORTABLE	1988	WINCO HP3000	A	H
R&B	120184	GENERATOR STATIONARY	1980	WINCO 35HDS17R	F	H
R&B	127968	GENERATOR STATIONARY	1983	WINCO B35HDS17RA	F	H
R&B	127969	GENERATOR STATIONARY	1983	WINCO B35HDS17RB	F	H
R&B	149531	GENERATOR STATIONARY	1997	PERKINS 20DS60	F	H
R&B	163118	GENERATOR STATIONARY	2004	SPECTRUM 80DSJ	F	H
R&B	167239	GENERATOR STATIONARY	2005	SPECTRUM 300DSE	F	H
R&B	010018	GOLF CART	1993	YAMAHA GOLF CART	A	M
R&B	010020	GOLF CART	1993	YAMAHA GOLF CART	A	M
R&B	010021	GOLF CART	1993	YAMAHA GOLF CART	A	M
R&B	140645	LIGHT TOWER	1990	AMIDA LIGHT TWR	A	H
R&B	158584	MOWER BATWING	2001	BATWING MOWER	A	H
R&B	149864	MOWER FLAIL	1995	TIGER FLAIL	A	M
R&B	149869	MOWER FLAIL	1995	TIGER FLAIL	A	M
R&B	149870	MOWER FLAIL	1995	TIGER FLAIL	A	M
R&B	164101	MOWER FLAIL	2006	SCAG MOWER	A	H
R&B	142690	MOWER PUSH	1991	GRAVELY MOWER	A	M
R&B	151431	MOWER PUSH	1997	GRAVELY PRO 200	A	M
R&B	157161	POWER SCREEN	2000	PWR SCRN PWR SCREEN	A	H
R&B	166704	PU BROOM	2006	CAT BROOM	A	H
R&B	135453	PUMP	1988	KOSHIN Pump	A	H
R&B	135454	PUMP	1988	KOSHIN Pump	A	H
R&B	140977	PUMP	1990	PUMP,TRASH Pump	A	H
R&B	145705	PUMP	1985	6"PUMP 4039DF001	A	H
R&B	145706	PUMP	1985	TRASH-6-IN 2976W-PUMP	A	H
R&B	150341	PUMP	1996	PERKINS Pump	F	H
R&B	165647	SMALL ATV	2006	KUBOTA RTV900	A	H
R&B	165648	SMALL ATV	2006	KUBOTA RTV900	A	H
R&B	165649	SMALL ATV	2006	KUBOTA RTV900	A	H
R&B	165650	SMALL ATV	2006	KUBOTA RTV900	A	H
R&B	149736	STUMP GRINDER	1995	VERMEER STUMP GRND	A	H
R&B	144134	TAMPER	1993	ASPHALT TAMPER	A	H
R&B	144135	TAMPER	1993	ASPHALT TAMPER	A	H
R&B	144137	TAMPER	1993	WACKER BS60Y TAMP	A	H

Table A-2 Non-Rolling Stock – Cont.

DIVISION	EQUIP#	LACTYPE	YEAR	DESCRIPTION	BILL CODE	METER TYPE
R&B	144138	TAMPER	1993	WACKER BS60Y TAMP	A	H
R&B	144139	TAMPER	1993	WACKER BS60Y TAMP	A	H
R&B	156643	TAMPER	2000	WACKER TAMPER	A	H
R&B	156644	TAMPER	2000	WACKER TAMPER	A	H
R&B	156645	TAMPER	2000	WACKER TAMPER	A	H
R&B	151558	TRACTOR BROOM	1996	BROCE BROOM	F	H
R&B	128850	TRAILER	1989	TRAILER FLATBED	A	M
R&B	131974	TRAILER	1986	UTILITY TRAILER	A	M
R&B	138945	TRAILER	1990	WALLACE LOWBOY	A	M
R&B	142989	TRAILER	1992	HUDSON TRAILER	A	M
R&B	145222	TRAILER	1993	AOK TRAILER	A	M
R&B	146211	TRAILER	1994	MAGIC TILT TRAILER	A	H
R&B	153721	TRAILER	1998	AOK TRAILER	A	H
R&B	156599	TRAILER	2000	AOK TRAILER	A	H
R&B	156600	TRAILER	2000	AOK TRAILER	A	H
R&B	156641	TRAILER	2000	TOW LOAD TRAILER	A	H
R&B	156642	TRAILER	2000	TOW LOAD TRAILER	A	H
R&B	157139	TRAILER	2000	TOW LOAD TRAILER	A	H
R&B	157915	TRAILER	2001	International TRAILER	A	H
R&B	161414	TRAILER	2003	TRAILER TRAILER	A	H
R&B	161420	TRAILER	2003	AOK TRAILER	A	H
R&B	161427	TRAILER	2003	express TRAILER	A	H
R&B	165627	TRAILER	2006	LOAD TRAIL TRAILER	A	H
R&B	165628	TRAILER	2006	LOAD TRAIL TRAILER	A	H
R&B	165629	TRAILER	2006	LOAD TRAIL TRAILER	A	H
R&B	166684	TRAILER	2006	CAT TRAILER	A	H
R&B	166706	TRAILER	2006	CAT TRAILER	A	H
R&B	142732	WELDER	1991	MILLER LS-200	A	H
R&B	770330		2001	ROAD & BRIDGE ADM	F	M
R&B	770331		2001	ROAD & OIL & LUBE	A	M
R&B	999901		1998	CHEVY MSTA	A	H
R&B	999902		1998	CHEVY MSTA	A	H
R&B	999905		1998	CHEVY MSTA	A	H
SolidWaste	152839	BROOM SWEEPER	1998	LAYMORE 6-HB	A	H
SolidWaste	150977	COMPRESSOR	1990	COMPRESSOR COMPRESSOR	A	H
SolidWaste	155788	COMPRESSOR	2000	KOHLER COMPRESSOR	A	H
SolidWaste	152369	FORKLIFT	1995	CAT Forklift	F	H
SolidWaste	156628	FORKLIFT	2000	CAT TH83	F	H
SolidWaste	157000	GENERATOR PORTABLE	1995	KUBOTA 6KW	A	H
SolidWaste	152700	GENERATOR STATIONARY	1998	SPECTRUM 200DS60	F	H
SolidWaste	167390	GENERATOR STATIONARY	2006	CUMMINS Generator	F	H
SolidWaste	152753	LIGHT TOWER	1997	AMIDA 7075D	A	H
SolidWaste	152754	LIGHT TOWER	1997	AMIDA 7075D	F	H
SolidWaste	154328	LIGHT TOWER	1990	AMIDA LIGHT TWR	A	H
SolidWaste	154330	LIGHT TOWER	1990	AMIDA LIGHT TWR	A	H
SolidWaste	101100	PUMP	1977	CROUCH Pump	A	H
SolidWaste	110100	PUMP	1985	CROUCH Pump	F	H
SolidWaste	132704	PUMP	1986	D/P 8"PUMP	F	H
SolidWaste	141073	PUMP	1988	Thompson 6"PUMP	F	H
SolidWaste	141762	PUMP	1988	Thompson Pump	A	H
SolidWaste	144255	PUMP	1977	HYDRO PUMP Pump	F	H
SolidWaste	144256	PUMP	1977	HYDRO PUMP Pump	A	H
SolidWaste	145737	PUMP	1994	IRRIGAT Pump	A	H
SolidWaste	145823	PUMP	1988	Thompson Pump	F	H
SolidWaste	145824	PUMP	1988	Thompson Pump	F	H
SolidWaste	151732	PUMP	1997	Thompson 8"PUMP	F	H
SolidWaste	152239	PUMP	1990	PERKINS Pump	F	H
SolidWaste	152316	PUMP	2000	Thompson Pump	A	H
SolidWaste	153227	PUMP	1966	SLOAN 6"PUMP	F	H
SolidWaste	153260	PUMP	1998	Thompson Pump	A	H
SolidWaste	154326	PUMP	1999	HYDRO PUMP Pump	F	H
SolidWaste	157990	PUMP	1998	GORMAN 6"PUMP	F	H
SolidWaste	160576	PUMP	1999	CORNELL Pump	A	H
SolidWaste	160577	PUMP	1999	ACNE Pump	A	H
SolidWaste	163055	PUMP	1999	Thompson Pump	A	H
SolidWaste	163324	PUMP	2004	Thompson Pump	A	H
SolidWaste	163325	PUMP	2005	Thompson Pump	A	H
SolidWaste	155291	SMALL ATV	1999	POLARIS ATV	A	H
SolidWaste	155292	SMALL ATV	1999	POLARIS ATV	A	H
SolidWaste	156527	SMALL ATV	2000	J DEERE ATV	A	H
SolidWaste	157598	SMALL ATV	2002	GATOR ATV	A	H
SolidWaste	157599	SMALL ATV	2000	J DEERE GATOR ATV	A	H
SolidWaste	157999	SMALL ATV	2002	GATOR ATV	A	H
SolidWaste	166196	SMALL ATV	2006	POLARIS ATV	A	H
SolidWaste	166197	SMALL ATV	2006	POLARIS ATV	A	H

Table A-2 Non-Rolling Stock – Cont.

DIVISION	EQUIP#	LACTYPE	YEAR	DESCRIPTION	BILL CODE	METER TYPE
SolidWaste	152305	SPRAYER	2001	LANDSAVER SPRAYER	A	H
SolidWaste	153680	TIRE DERIMMER	1998	EAGLE XA600	F	H
SolidWaste	131813	TRAILER	1986	TRAILER TRAILER	A	H
SolidWaste	140264	TRAILER	1990	UTILITY TRAILER	A	M
SolidWaste	145340	TRAILER	1994	FRUEHAUF TRAILER	A	M
SolidWaste	150345	TRAILER	1996	WITZCO CH TRAILER	A	M
SolidWaste	151571	TRAILER	1994	LIDDELL TRAILER	A	M
SolidWaste	151805	TRAILER	1997	CUSTOM TRAILER	A	M
SolidWaste	152566	TRAILER	1998	ALLADIN TRAILER	A	H
SolidWaste	159653	TRAILER	2002	AOK VAN CARGO	A	M
SolidWaste	161076	TRAILER	2003	MACK TRAILER	A	H
SolidWaste	161077	TRAILER	2005	MACK TRAILER	A	M
SolidWaste	161078	TRAILER	2003	MACK TRAILER	A	H
SolidWaste	165630	TRAILER	2006	LOAD TRAIL TRAILER	A	H
SolidWaste	149677	TRAILER GARBAGE	1995	MCCLAIN TRAILER#7	A	M
SolidWaste	149678	TRAILER GARBAGE	1995	MCCLAIN TRAILER#4	A	H
SolidWaste	149679	TRAILER GARBAGE	1995	MCCLAIN TRAILER#3	A	H
SolidWaste	149680	TRAILER GARBAGE	1995	MCCLAIN TRAILER	A	M
SolidWaste	151851	TRAILER GARBAGE	1997	MCCLAIN TRAILER #9	A	M
SolidWaste	151852	TRAILER GARBAGE	1997	MCCLAIN TRAILER#10	A	M
SolidWaste	151853	TRAILER GARBAGE	1997	MCCLAIN TRAILER #8	A	M
SolidWaste	154410	TRAILER GARBAGE	1999	GARBAGE TRAILER	A	H
SolidWaste	156981	TRAILER GARBAGE	2001	MCCLAIN TRAILER	A	H
SolidWaste	157530	TRAILER GARBAGE	2001	MCCLAIN TRAILER	A	M
SolidWaste	164593	TRAILER GARBAGE	2005	MCCLAIN TRAILER	A	H
SolidWaste	164594	TRAILER GARBAGE	2005	MCCLAIN TRAILER	A	H
SolidWaste	164595	TRAILER GARBAGE	2005	MACK TRAILER	A	H
SolidWaste	164596	TRAILER GARBAGE	2005	MCCLAIN TRAILER	A	H
SolidWaste	153954	TROMMEL	1999	ATHENS DIS HARROW	A	H
SolidWaste	760351		2001	SOLID WAST OIL & LUBE	F	M
SolidWaste	767856		2000	SOLID WAST SKID MOO#	F	H
SolidWaste	767858		1910	SOLID WAST OIL & LUBE	A	H
SolidWaste	770305		2001	SOLID WAST MISC #	A	H
SolidWaste	770350		2001	SOLID WAST TOMOKA	F	M
Traffic	153979	ARROW TRAILER	2004	ARROW TRAILER	A	H
Traffic	164179	GENERATOR PORTABLE	2005	DEERE Generator	F	H
Traffic	155922	GENERATOR STATIONARY	2000	SPECTRUM Generator	F	H
Traffic	160837	TIRE DERIMMER	2002	HAULMARK MC612BS	A	M
Traffic	154747	TRACTOR BROOM	2000	DEERE 4100	A	H
Traffic	144214	TRAILER	1993	TRAILER CUSTOM	A	M
Traffic	150461	TRAILER	1996	ADDCO TRAILER	A	H
Traffic	150462	TRAILER	1996	ADDCO TRAILER	A	H
Traffic	150463	TRAILER	1996	ADDCO TRAILER	A	H
Traffic	152250	TRAILER	1997	TRAILER T1687	A	H
Traffic	153955	TRAILER	1999	TRAILER TRAILER	A	H
Traffic	770325		2001	TRAFFIC ENGINEER	A	H
Utilities	141132	GENERATOR PORTABLE	1990	INGERSOLL Generator	A	H
Utilities	143128	GENERATOR PORTABLE	1991	INGERSOLL Generator	A	H
Utilities	144293	GENERATOR PORTABLE	1993	INGERSOLL Generator	A	H
Utilities	149303	GENERATOR PORTABLE	1997	INGERSOLL Generator	A	H
Utilities	159987	GENERATOR PORTABLE	2002	SPECTRUM Generator	A	H
Utilities	159988	GENERATOR PORTABLE	2002	SPECTRUM Generator	A	H
Utilities	164013	GENERATOR PORTABLE	2004	MAGNUM Generator	A	H
Utilities	164014	GENERATOR PORTABLE	2004	MAGNUM Generator	A	H
Utilities	450014	GENERATOR STATIONARY	1990	CAT BEACONLITE	F	H
Utilities	450015	GENERATOR STATIONARY	1990	FORD Generator	F	H
Utilities	450016	GENERATOR STATIONARY	1990	J DEERE HALIFAXPLA	F	H
Utilities	457001	GENERATOR STATIONARY	1992	CAT 3208	F	H
Utilities	457002	GENERATOR STATIONARY	1992	PERKINS KATOLGHT	F	H
Utilities	457003	GENERATOR STATIONARY	1992	KATO G-35760	F	H
Utilities	457004	GENERATOR STATIONARY	1992	CAT SR4	F	H
Utilities	457005	GENERATOR STATIONARY	1992	CAT 3208T-SR4	F	H
Utilities	457006	GENERATOR STATIONARY	1992	CAT SR4	F	H
Utilities	457008	GENERATOR STATIONARY	1992	DET 3045-C	F	H
Utilities	457009	GENERATOR STATIONARY	1995	CUMMINS 4B39	F	H
Utilities	457010	GENERATOR STATIONARY	1977	KATO Generator	F	H
Utilities	457011	GENERATOR STATIONARY	1992	CAT 3208	F	H
Utilities	457012	GENERATOR STATIONARY	1992	KAYTO D135FRP4	F	H
Utilities	457013	GENERATOR STATIONARY	1992	SCANIA Generator	F	H
Utilities	457014	GENERATOR STATIONARY	1992	CAT DETROIT	F	H
Utilities	457016	GENERATOR STATIONARY	1992	CUMMINS 3500DFCC	F	H
Utilities	457017	GENERATOR STATIONARY	1998	ONAN Generator	F	H
Utilities	457018	GENERATOR STATIONARY	1999	KAYTO D110FJH4	F	H
Utilities	140944	PUMP	1989	GORMAN Pump	A	H
Utilities	149965	PUMP	1990	WISCONSIN WATER PUMP	A	H

Table A-2 Non-Rolling Stock – Cont.

DIVISION	EQUIP#	LACTYPE	YEAR	DESCRIPTION	BILL CODE	METER TYPE
Utilities	156337	PUMP	2005	YANMAR WATER PUMP	A	H
Utilities	163721	PUMP	2004	Thompson Pump	A	H
Utilities	159188	TAMPER	2002	AOK TRAILER	A	M
Utilities	148359	TRAILER	1995	AOK TRAILER	A	M
Utilities	152368	TRAILER	1997	PACE TRAILER	A	M
Utilities	154141	TRAILER	1999	ROTATORJET TRAILER	A	H
Utilities	155823	TRAILER	2000	TRAILER CH7018	A	H
Utilities	162350	TRAILER VACUUM	2004	pipehunter vac trailer	A	H
Utilities	770100		2001	UTILITY ENGINEERIN	A	H
Utilities	770601		2001	UTILITY COLLECTION	A	H
Utilities	770800		2001	UTILITY BILLING	A	H
Utilities	777101		2001	UTILITY ADMIN	A	M
Utilities	777110		2001	UTILITIES ADMIN	A	M
Utilities	777140		2001	UTILITIES WATER	A	M
Utilities	777150		2001	UTILITIES SEWER	A	M
Utilities	797800		2004	MISC MISC #	A	H

6 - Appendix B
Low Usage Equipment

Appendix B*

*Please note the equipment data utilized is for a point in time from when the initial data was received. LAC used equipment data supplied from the Fleet Department though some divisions tracked their fleet equipment separately.

There are discrepancies between the fleet data and the division equipment data. LAC has noted these discrepancies in recommendation 73 as an area for improvement. Further these data discrepancies should be resolved prior to using this information for making decisions on a future action on any specific piece of equipment as meters may have changed or other usage occurred which are not documented in the Fleet data.

Table B-1 Low Use Equipment

EQUIP#	DIV	LACTYPE	YEAR	DESCRIPTION	METER TYPE	AvgAnnMeter	APWA USAGE
157628	Admin	SUV	2001	Chevy BLAZER 4X4	M	2,451	10,000
125494	MC	TRACTOR FARM	1982	ALLIS CHAL X	H	41	639
125493	MC	TRACTOR FARM	1982	ALLIS CHAL 5020	H	53	639
129325	MC	DITCH DIGGER	1986	ARDCO DITCHWITCH	H	66	525
129322	MC	TRUCK TRACTOR	1985	GMC GENERAL	H	92	639
149921	MC	GRADALL	1996	Gradall XL5100	H	95	757
153204	MC	GRADALL	1999	Gradall GW-626-41	H	113	757
160704	MC	DOZER	2001	POSITRACH DOZER	H	132	525
135078	MC	TRUCK SPRAY	1987	FORD F8000	H	138	525
164303	MC	GRADALL	1996	Gradall XL5200	H	254	757
145641	MC	TRACTOR FARM	1995	FORD 9030	H	316	639
133396	MC	PU 1/2T	1987	FORD RANGER	M	1,291	10,000
129305	MC	TRUCK 1T	1985	Chevy 1T SERVICE	M	1,296	14,000
133393	MC	PU 1/2T	1987	FORD COMP	M	1,502	10,000
133395	MC	PU 1/2T	1988	FORD RANGER	M	1,557	10,000
145625	MC	PU 1/2T	1994	FORD RANGER	M	1,752	10,000
142998	MC	PU 1/2T	1993	FORD COMP	M	1,847	10,000
143102	MC	PU 1/2T	1993	FORD COMP	M	1,848	10,000
149930	MC	PU 1/2T	1997	FORD RANGER	M	2,019	10,000
133407	MC	PU 1/2T	1988	FORD RANGER	M	2,108	10,000
133406	MC	PU 1/2T	1988	FORD COMP	M	2,321	10,000
145624	MC	PU 1/2T	1994	FORD COMP	M	2,334	10,000
140766	MC	PU 1/2T	1990	FORD RANGER	M	2,443	10,000
149929	MC	PU 1/2T	1997	FORD COMP	M	2,672	10,000
133392	MC	PU 1/2T	1987	FORD RANGER	M	3,111	10,000
151542	MC	PU 1/2T	1998	FORD RANGER	M	3,120	10,000
144240	R&B	MIXER	1990	REX MIXER	H	2	525
120117	R&B	ROLLER RUBBER	1980	HYSTER C530A	H	11	525
163728	R&B	MOWER	2004	SCAG MOWER	H	15	665
135439	R&B	TAR DISTRIBUTOR	1988	FORD Tar Spreader	H	24	525
155298	R&B	TRACTOR FARM	1999	MASSEY SLOPE	H	24	639
162686	R&B	MOWER RIDING	2003	SCAG MOWER	H	26	665
162688	R&B	MOWER RIDING	2004	SCAG MOWER	H	32	665
163126	R&B	ROLLER STEEL	2004	WACKER RD11	H	32	525
162687	R&B	MOWER RIDING	2004	SCAG MOWER	H	40	665
135449	R&B	FLATBED CREW	1988	GMC FLAT/CREW	H	46	525
159748	R&B	MOWER RIDING	2002	SCAG RIDING MWR	H	60	665
157141	R&B	TRACTOR FARM	2000	HOLLAND GRADING	H	63	639
155302	R&B	TRACTOR FARM	1999	MASSEY SLOPE	H	69	639
140108	R&B	ROLLER RUBBER	1985	HYSTER ROLLER	H	71	525
143696	R&B	DUMP 18YD	1993	VOLVO TRIAXLE	H	77	525
157827	R&B	MOWER RIDING	2002	HUSTLER MOWER	H	78	665
140511	R&B	TAR DISTRIBUTOR	1990	FORD F800	H	87	525
139996	R&B	TRACTOR FARM	1990	FORD BROOM 6610	H	89	639
144975	R&B	TRACTOR FARM	1993	FORD BROOM 6610	H	92	639
155300	R&B	TRACTOR FARM	1999	MASSEY Tractor	H	92	639
154285	R&B	ROLLER STEEL	1998	INGERSOLL DD65ROLLER	H	95	525
143694	R&B	DUMP 18YD	1993	VOLVO TRIAXLE	H	95	525
152965	R&B	TRACTOR FARM	1998	FORD 6610	H	111	639
151558	R&B	TRACTOR BROOM	1996	BROCE BROOM	H	112	639
159749	R&B	TILLER	1999	BOMAG TILLER	H	125	525
155299	R&B	TRACTOR FARM	1999	MASSEY SLOPE	H	127	639
133865	R&B	DUMP 6YD	1987	FORD 6 YD	H	133	525
152966	R&B	TRACTOR FARM	1998	FORD 6610	H	135	639
157494	R&B	BACKHOE LOADER	1997	BACKHOE 426C CAT	H	160	757
156362	R&B	TRACTOR FARM	2000	MASSEY CHEMICAL	H	163	639

Table B-1 Low Use Equipment – Cont.

EQUIP#	DIV	LACTYPE	YEAR	DESCRIPTION	METER TYPE	AvgAnnMeter	APWA USAGE
142821	R&B	GRADALL	1991	Gradall G660E	H	169	757
156883	R&B	MOWER RIDING	2000	SCAG RIDING MWR	H	170	665
161751	R&B	MOWER RIDING	2003	TIGER MOWER	H	173	665
152964	R&B	TRACTOR FARM	1998	FORD 6610 R2	H	177	639
162346	R&B	GRADER	2004	CAT M413XT	H	178	617
151551	R&B	GRADALL	1997	BADGER 460	H	190	757
140495	R&B	TRUCK FLATBED	1990	FORD FLTBED	H	191	525
152372	R&B	BACKHOE LOADER	1995	CAT 416B	H	208	757
136430	R&B	FLATBED CREW	1987	FORD F8000	H	211	525
156612	R&B	TRUCK FLATBED	2000	Sterling FLTBED	H	212	525
157162	R&B	GRADALL	2000	Gradall XL4100	H	222	757
152963	R&B	TRACTOR FARM	1998	FORD 10FT	H	225	639
129804	R&B	TRUCK TRACTOR	1985	FORD TRACK TRK	H	241	639
140644	R&B	TRUCK WATER	1987	FORD LNT8000	H	243	525
156593	R&B	TRACTOR FARM	2000	MASSEY SLOPE	H	258	639
161411	R&B	BACKHOE LOADER	2003	CAT 430d	H	262	757
155303	R&B	TRACTOR FARM	1999	MASSEY 6610	H	265	639
137750	R&B	TRUCK WATER	1986	FORD F800 4.0 T	H	267	525
145210	R&B	ROLLER STEEL	1993	INGERSOLL SD-150D	H	267	525
152749	R&B	BACKHOE LOADER	1996	CAT 426C CAT	H	273	757
152748	R&B	BACKHOE LOADER	1996	CAT 426C CAT	H	274	757
156363	R&B	TRACTOR FARM	2000	MASSEY CHEMICAL	H	277	639
156361	R&B	TRACTOR FARM	2000	MASSEY CHEMICAL	H	304	639
160377	R&B	LOADER WHEEL	2002	CAT 950G LOADR	H	311	838
162348	R&B	BACKHOE LOADER	2004	CAT 430d	H	342	757
163117	R&B	LOADER WHEEL	2004	CAT 950G LOADR	H	361	838
163122	R&B	VAN	2004	Chevy VAN CARGO	M	2,817	10,000
154946	SW	MOWER	1999	SCHULTY MOWER	H	2	665
157971	SW	MOWER BUSH HOG	2001	BUSH HOG 3615RPR	H	2	665
155292	SW	SMALL ATV	1999	POLARIS ATV	H	31	525
157999	SW	SMALL ATV	2002	GATOR ATV	H	40	525
157599	SW	SMALL ATV	2000	J DEERE GATOR ATV	H	60	525
156527	SW	SMALL ATV	2000	J DEERE ATV	H	60	525
155294	SW	MOWER RIDING	2001	KUBOTA MOWER	H	63	665
152262	SW	TRACTOR BROOM	1997	BROCE RC300	H	69	639
157598	SW	SMALL ATV	2002	GATOR ATV	H	70	525
149625	SW	TRACTOR FARM	1995	FORD 345D	H	74	639
152839	SW	BROOM SWEEPER	1998	LAYMORE 6-HB	H	75	525
151651	SW	MOWER RIDING	1997	JACOBSON MOWER	H	101	665
159751	SW	ROLLER RUBBER	2002	CAT SKID ROLR	H	161	525
151080	SW	TRACTOR FARM	1996	CAT CHALLNGR	H	174	639
155293	SW	TRACTOR MOWER	2000	KUBOTA Tractor	H	222	525
155291	SW	SMALL ATV	1999	POLARIS ATV	H	223	525
165623	SW	PU 1/2T	2001	FORD F150	M	2,523	10,000
145272	SW	VAN	1994	FORD VAN PASS	M	4,269	10,000
162318	SW	PU 3/4T	2003	FORD 3/4 CREW	M	4,793	10,000
154747	Traffic	TRACTOR BROOM	2000	DEERE 4100	H	16	639
162663	Util	MOWER BUSH HOG	2003	BUSH HOG 3710	H	3	665
150079	Util	TRACTOR FARM	1996	DEERE 1070	H	47	639
148003	Util	TRACTOR MOWER	1992	J DEERE 37N84-RJK	H	60	525
145JDT	Util	TRACTOR FARM	1994	DEERE 870	H	95	639
149623	Util	BACKHOE LOADER	1994	CAT 416B	H	199	757
155760	Util	EXCAVATOR	1999	Bobcat MINI-EXCAV	H	216	757